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1/ 332

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02/05/02

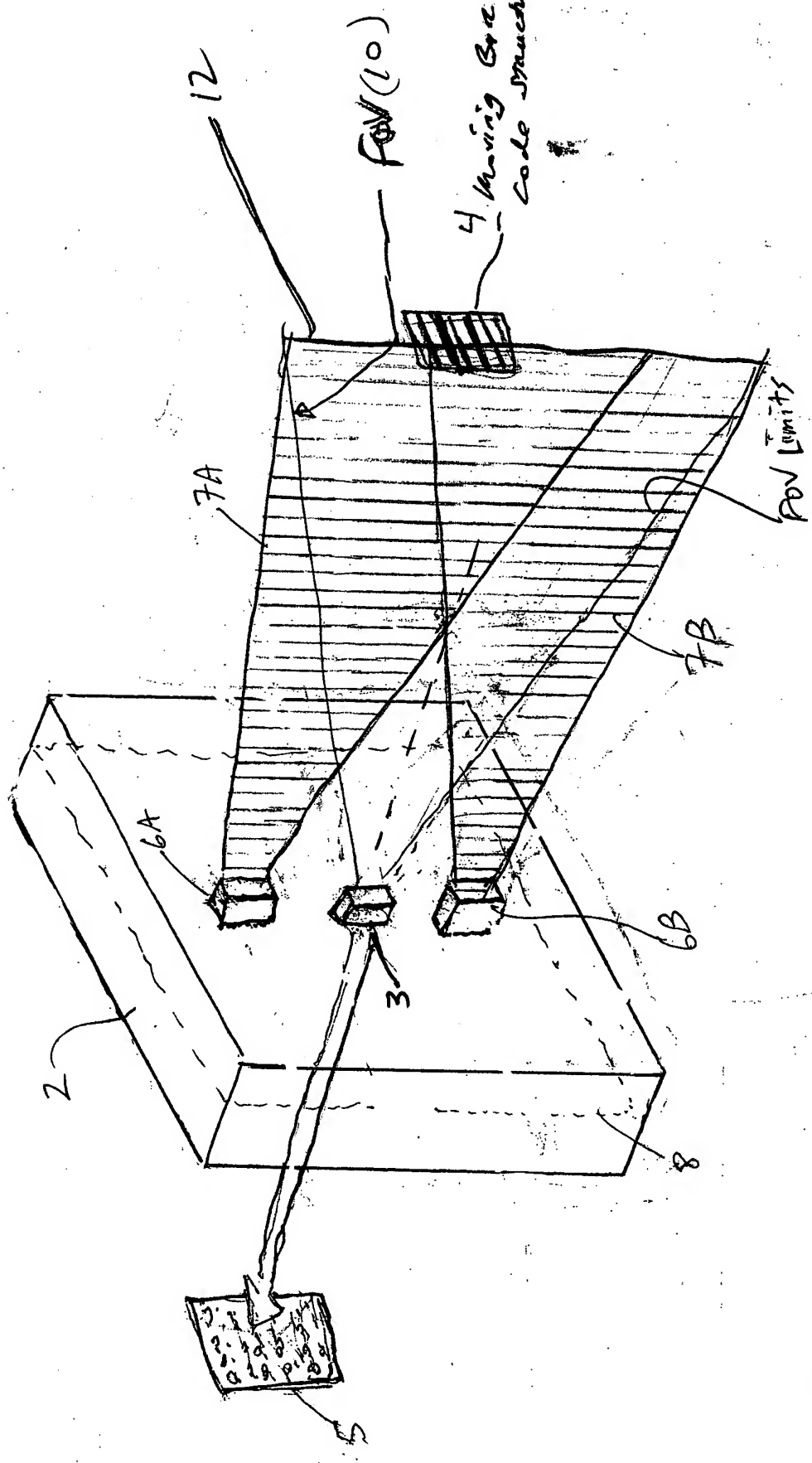
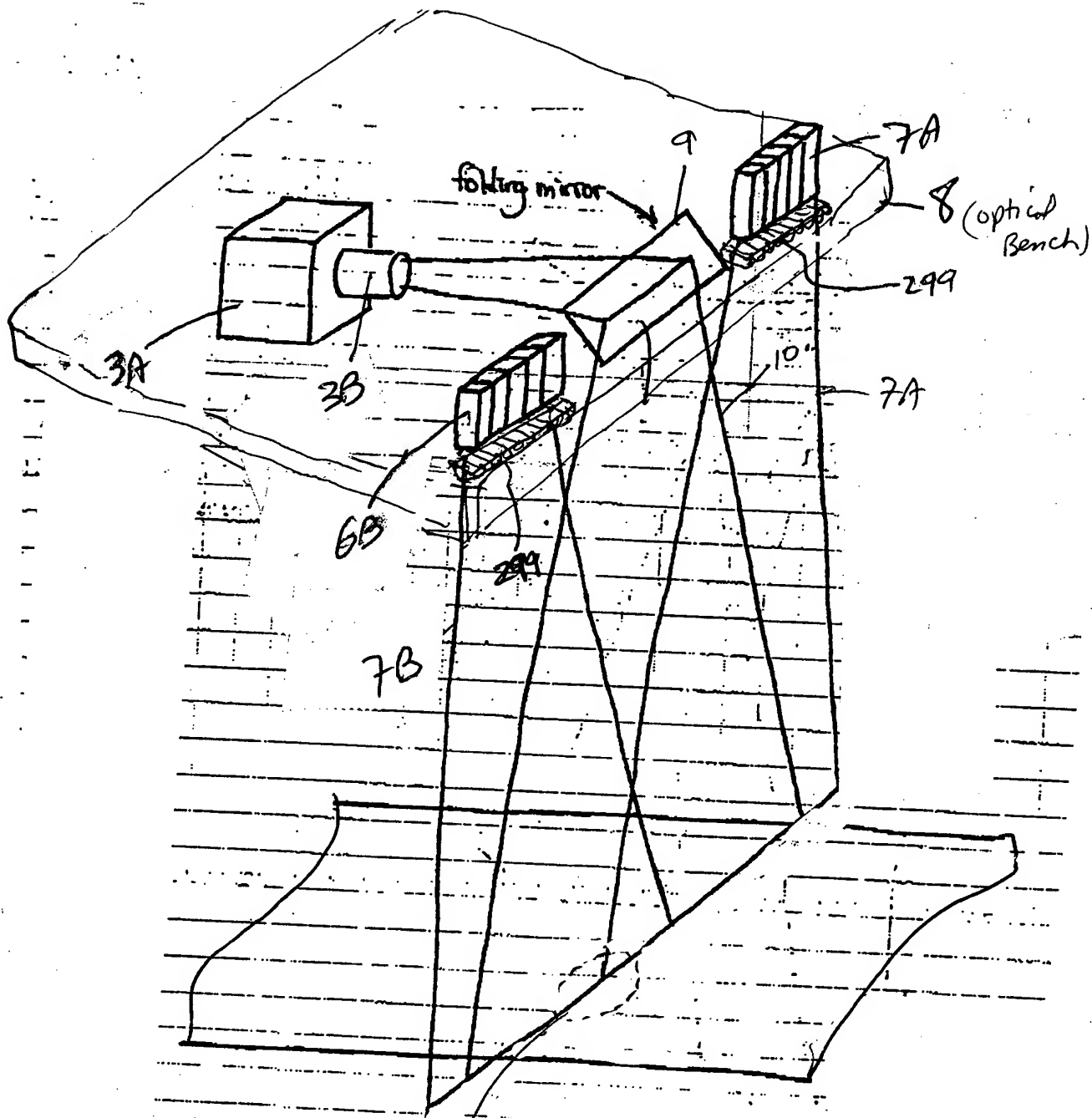


FIG 1A

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1A

FIG. 1B1

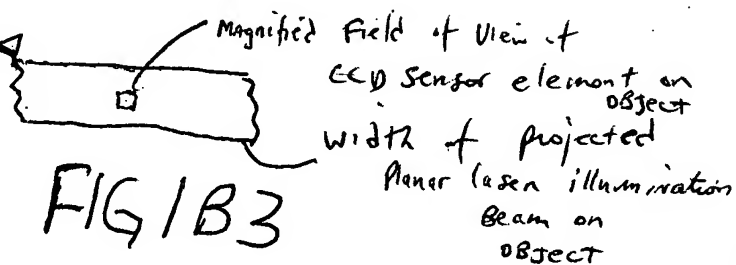


FIG. 1B3

FIG. 1B2

- (1) Fixed focal length camera lens
- (2) Fixed distance

Linear (1D) Detector array

Module housing

Planar laser illumination beam undergoes micro-movement

X_{FS}

1A

3B

6A

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9

FOV 10

4

11A 11C 11F

6B

7B

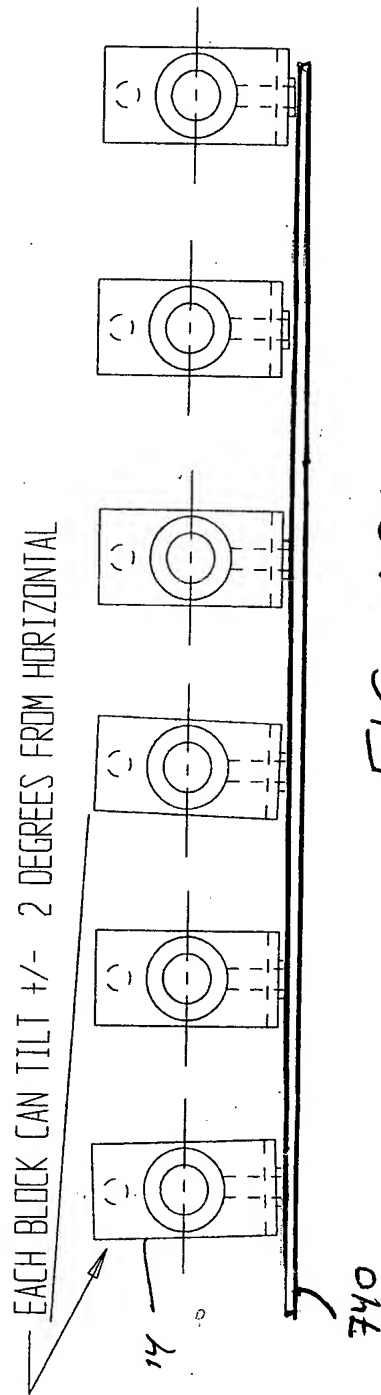
299

299

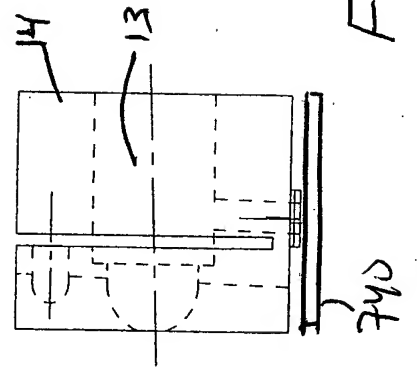
7A

FIG. 1B2





VLD BLOCK CAN PITCH FORWARD FOR ALIGNMENT WITH OTHER VLD BEAMS



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FIG. 1C

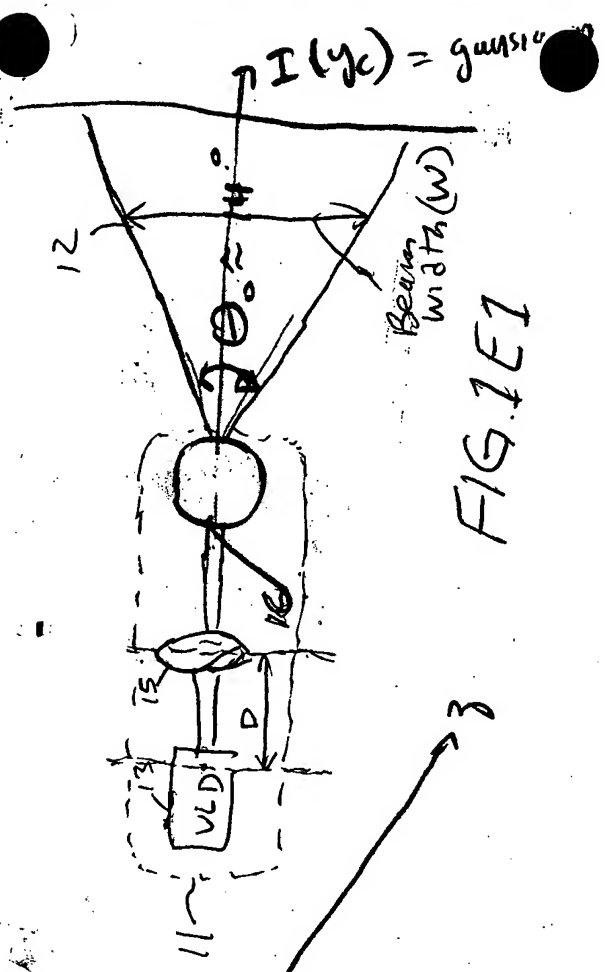


FIG. 1E1

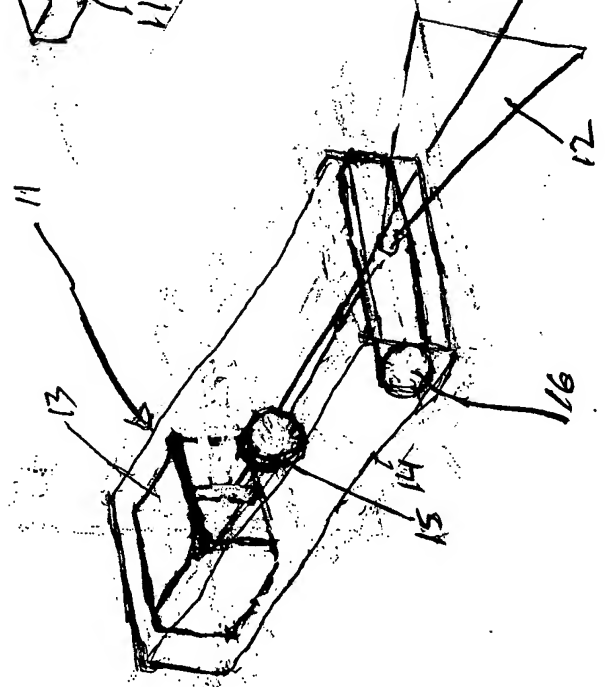


FIG. 1D

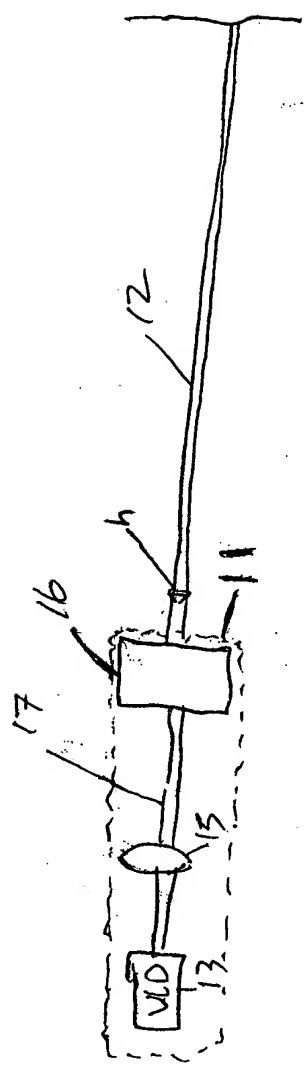


FIG. 1E2

Maximum
object
range

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Fixed focal length / Fixed focus distance

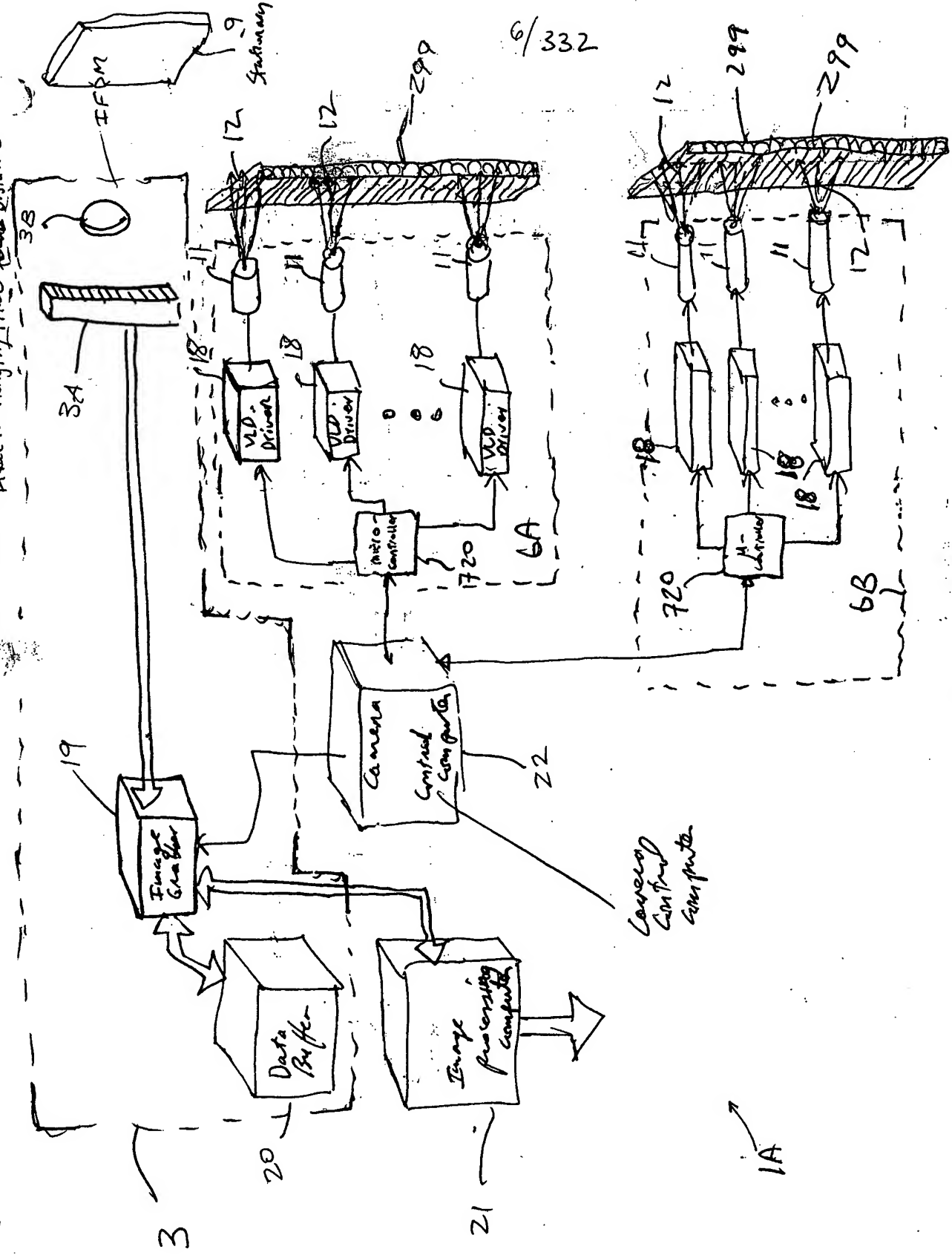


FIG. 1F



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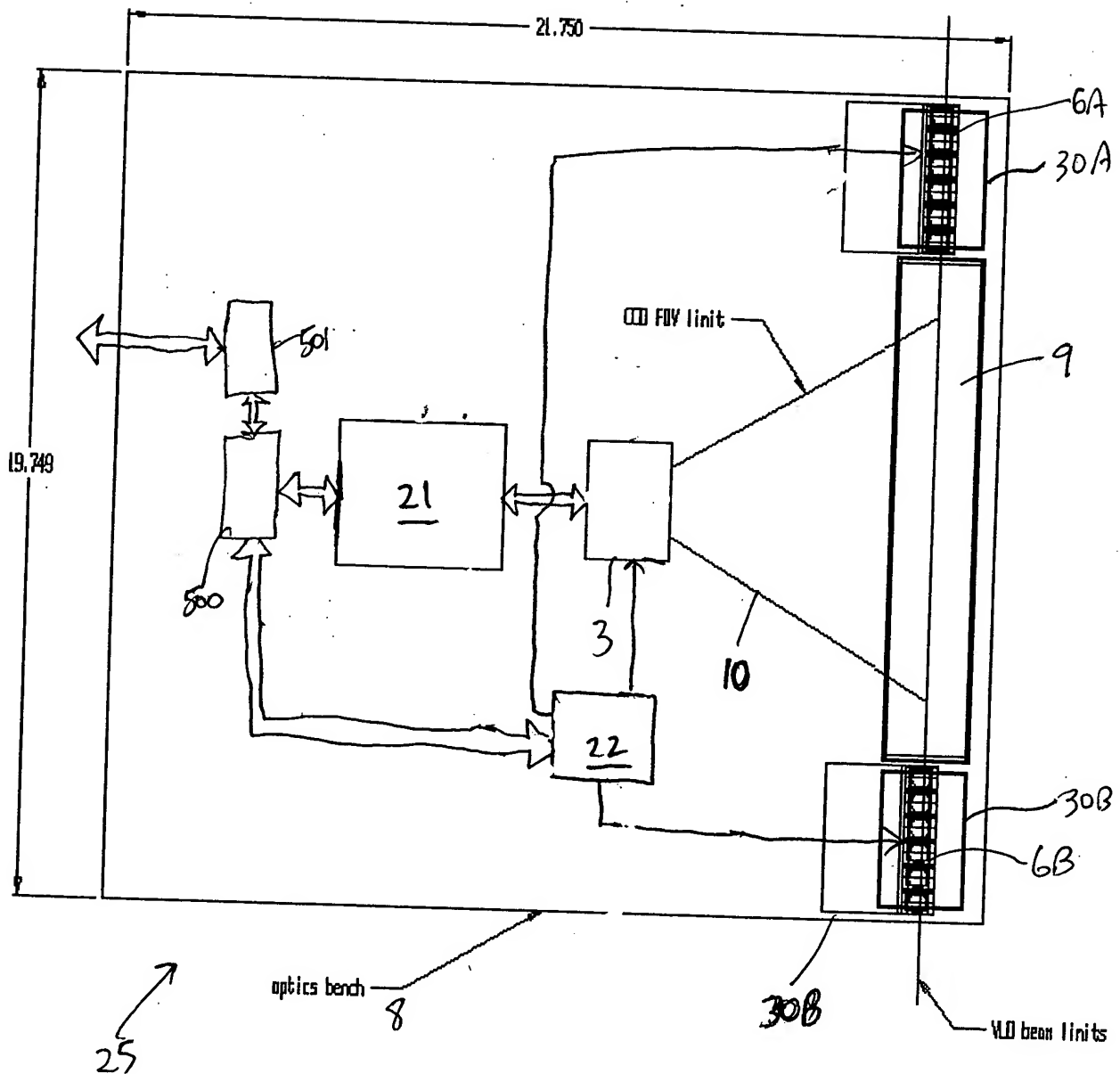


FIG. 142

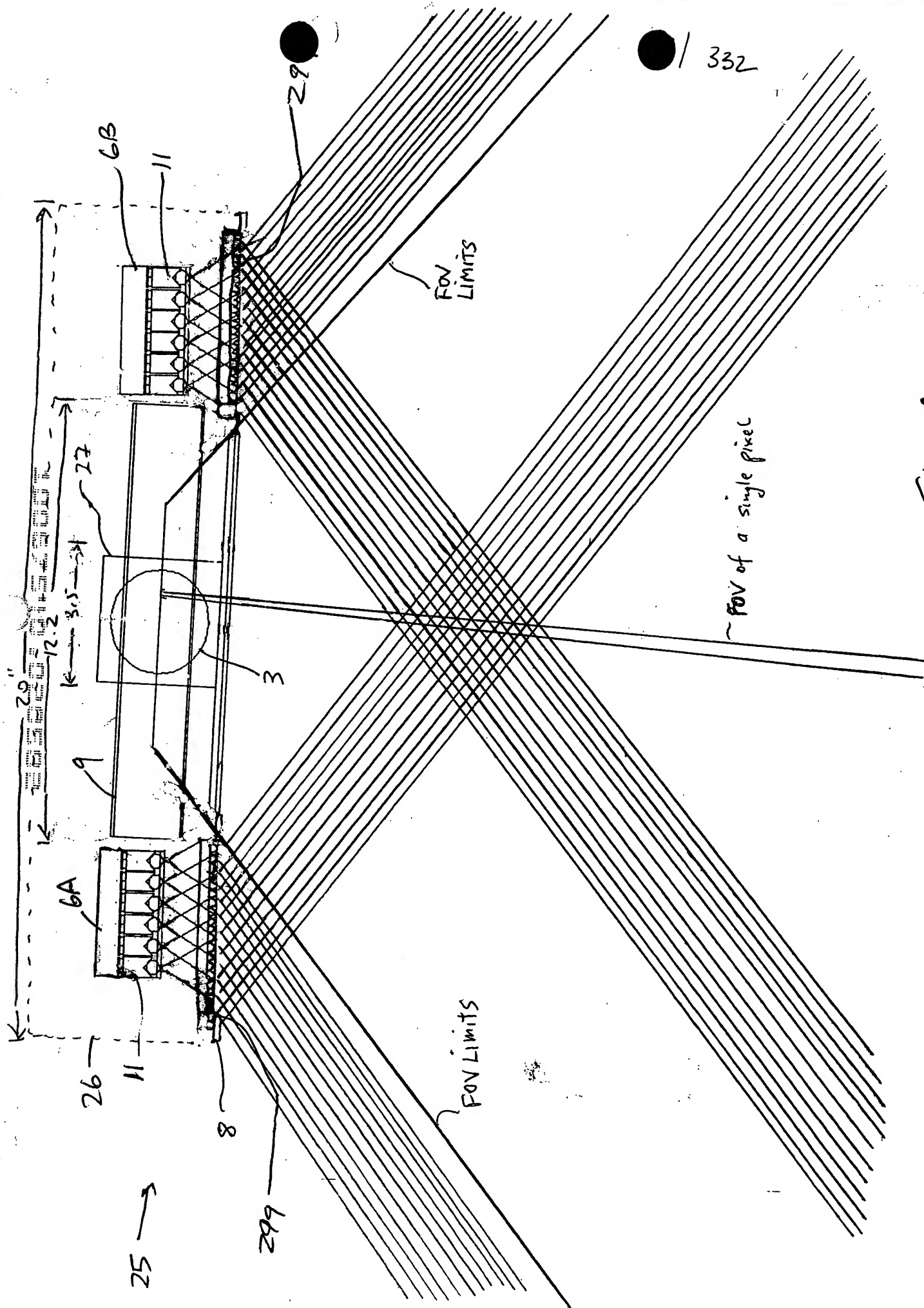
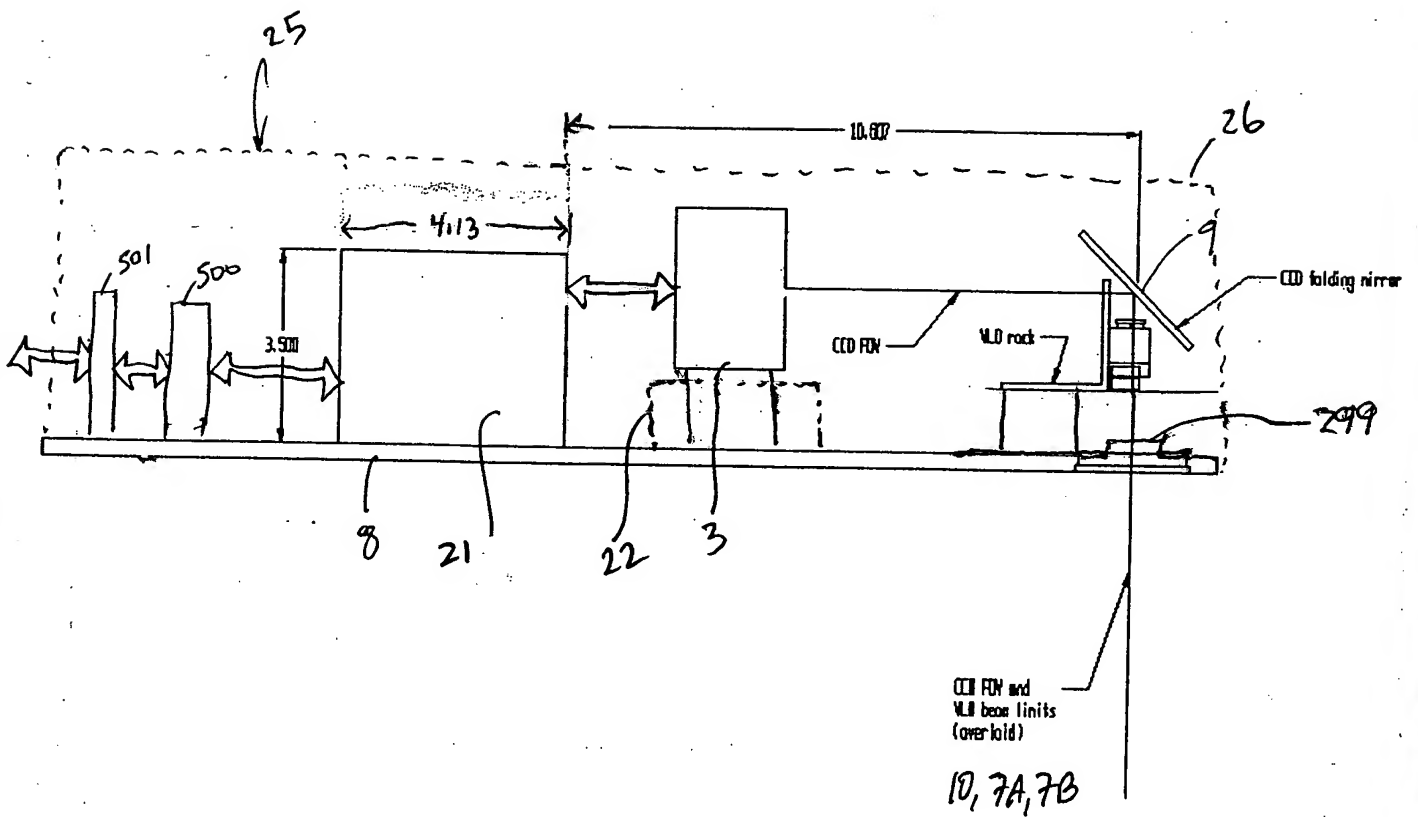
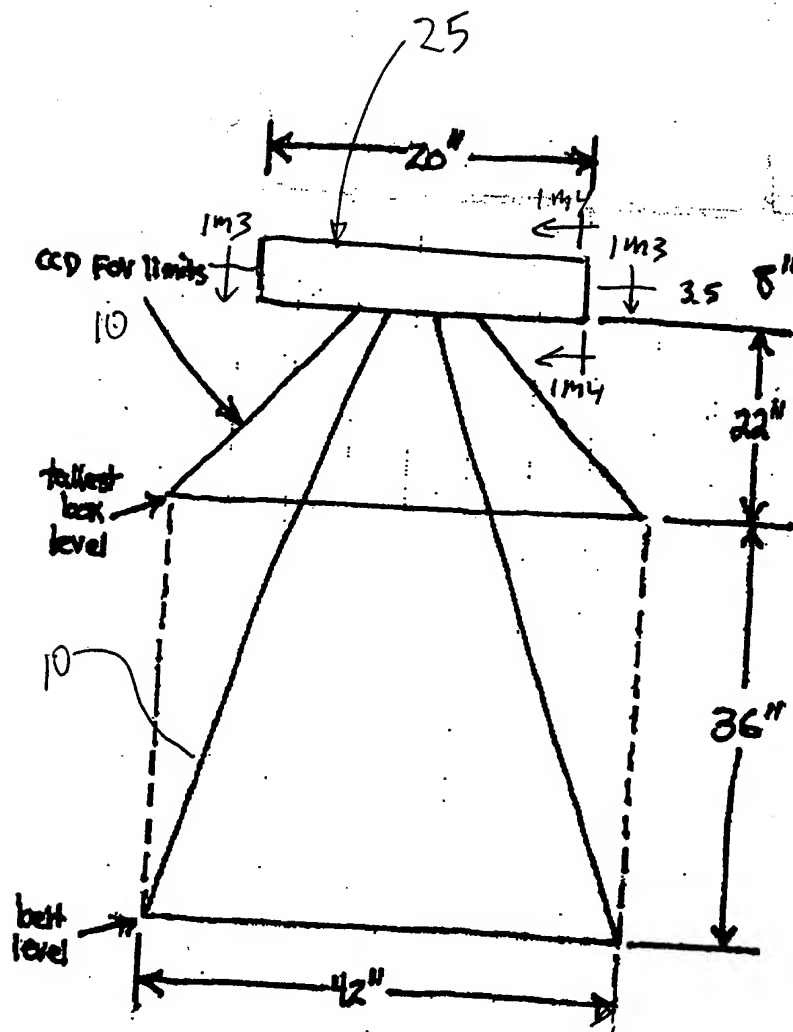


FIG. 1G3

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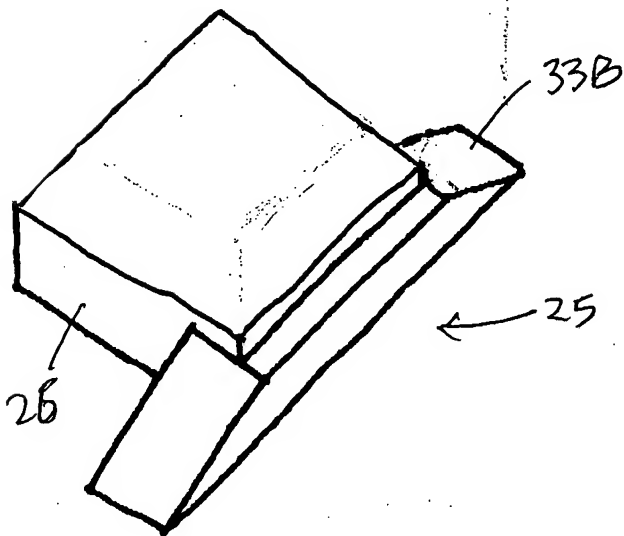
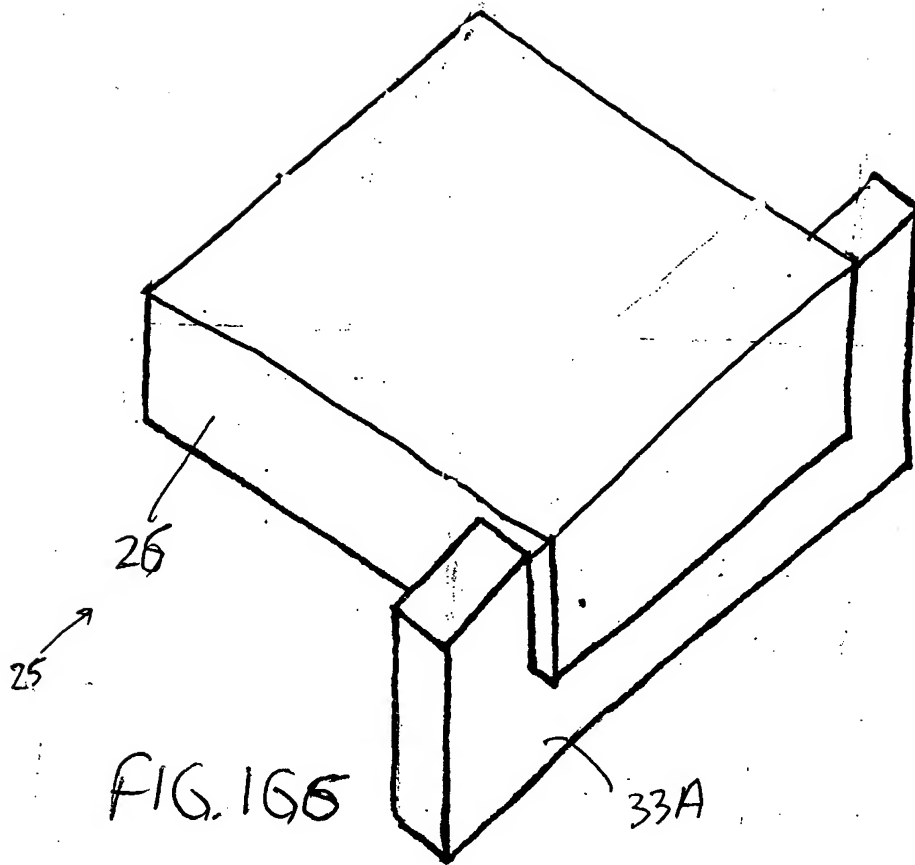


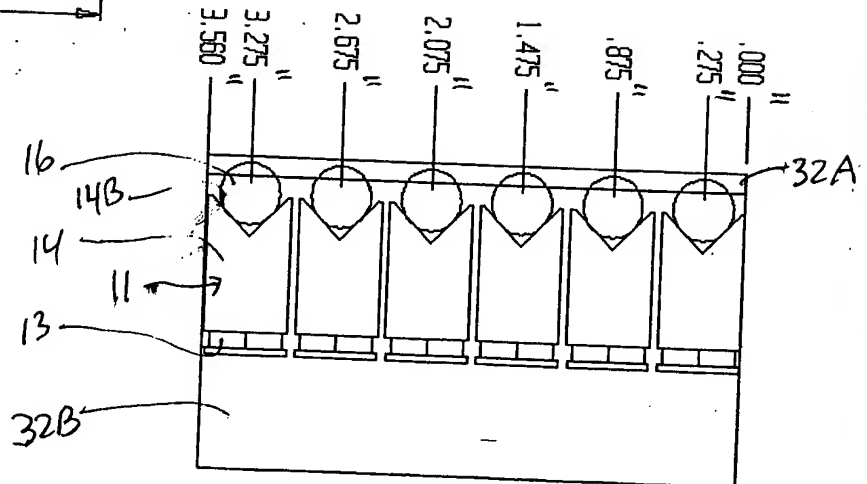
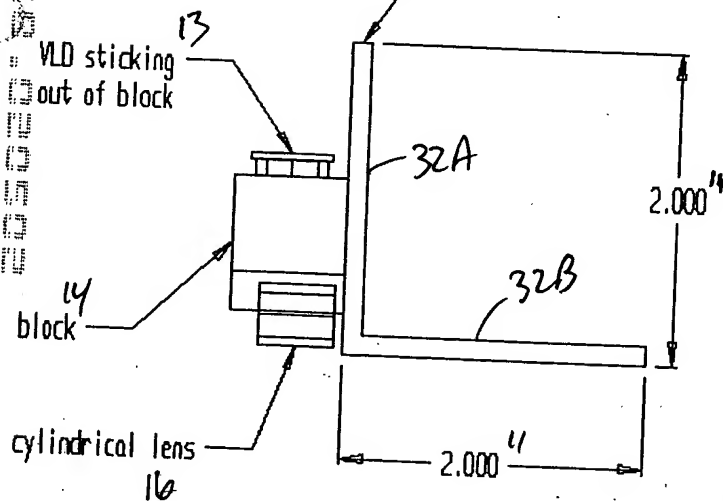
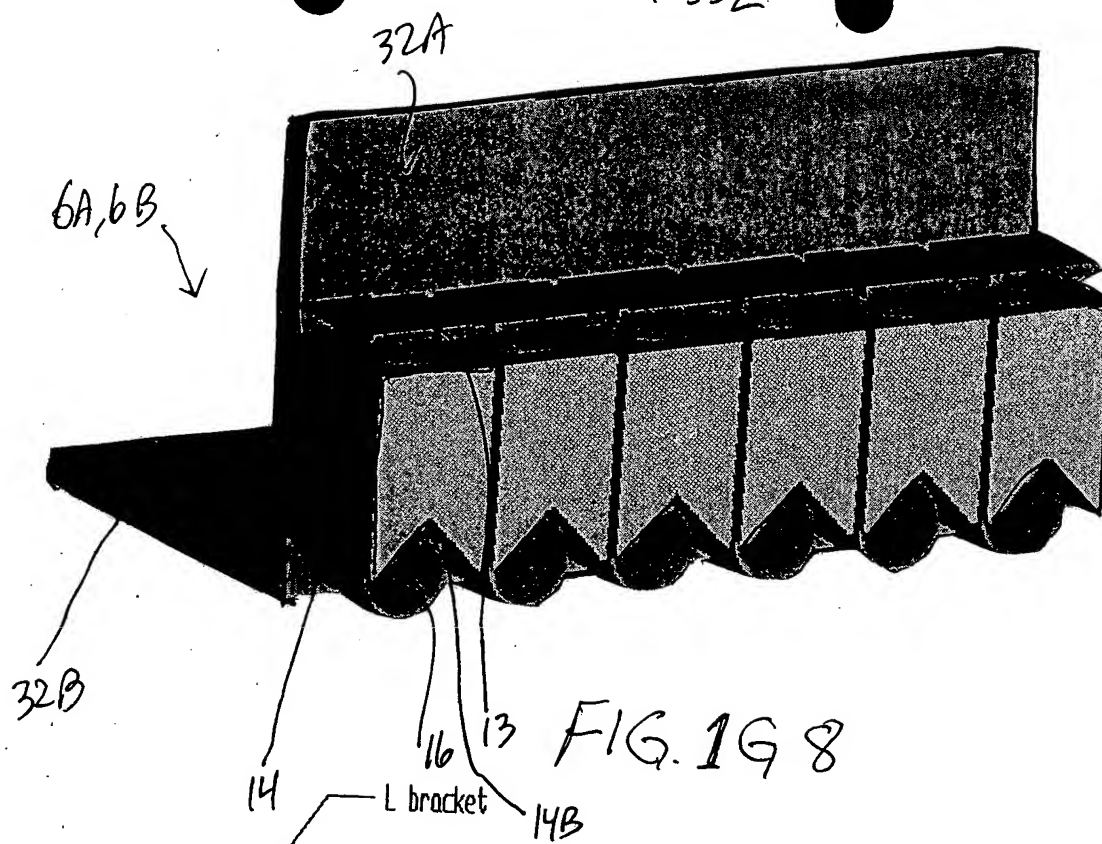
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* Fixed Field of View

FIG. 145





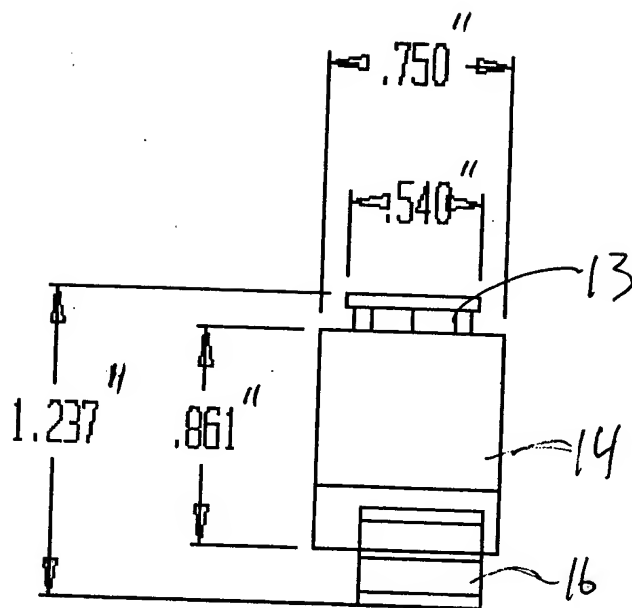


FIG. 1611

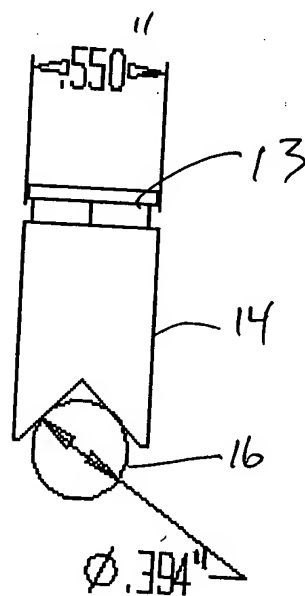


FIG. 1612

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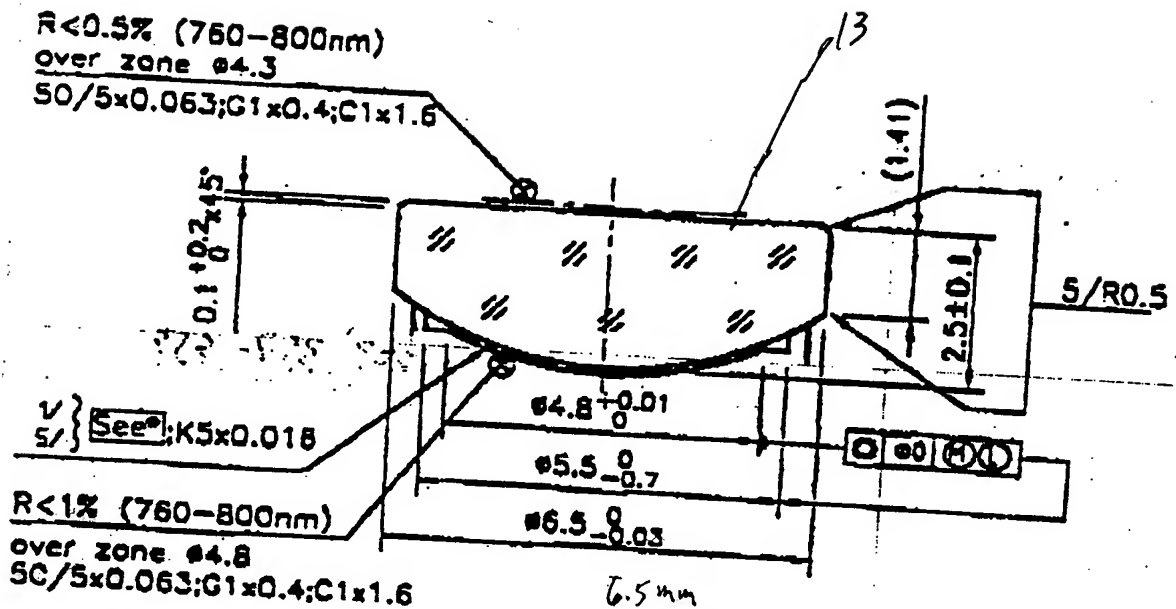


FIG. 1G13

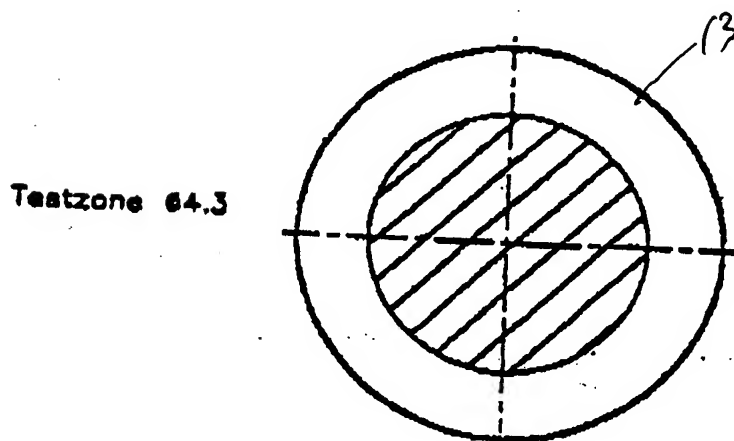


FIG. 1G14

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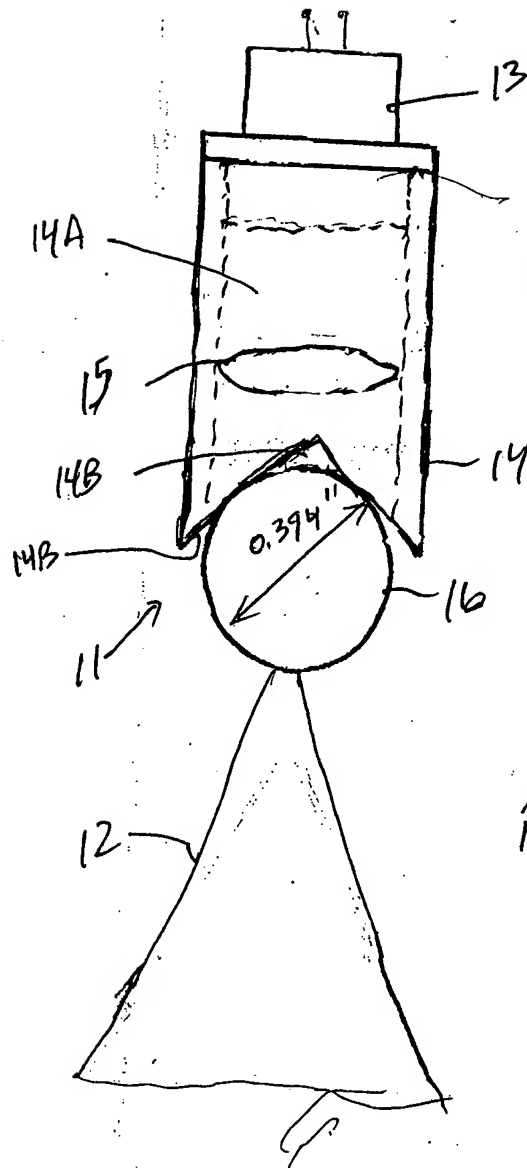


FIG. 1G15A

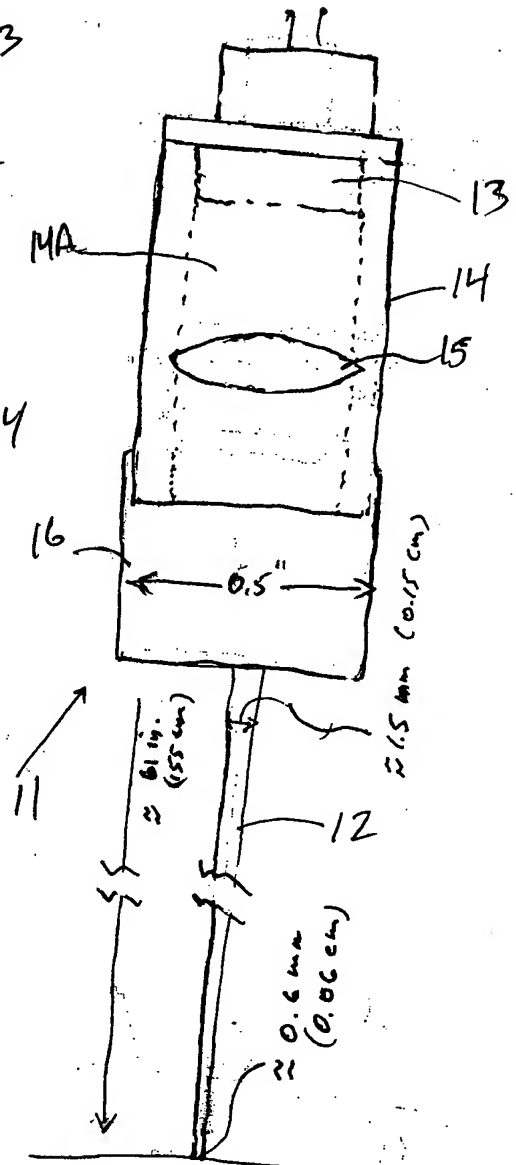


FIG. 1G15B

furthest
object/working
distance

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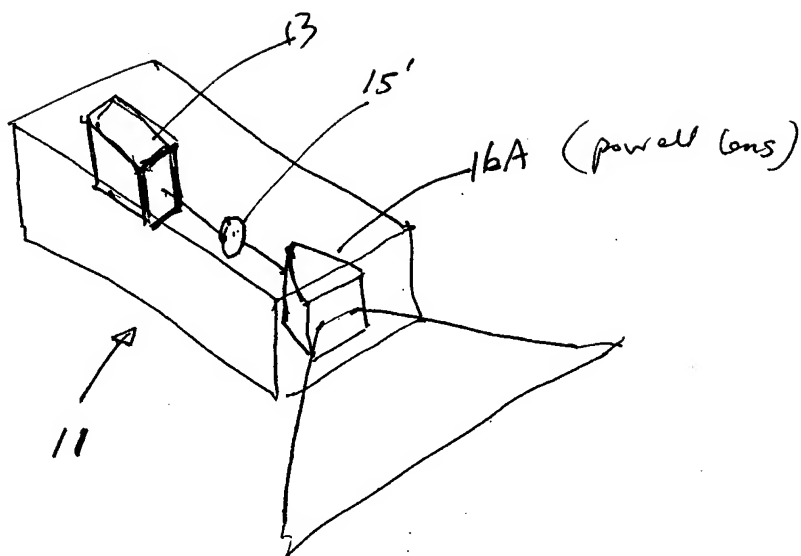


FIG. 1G.16A

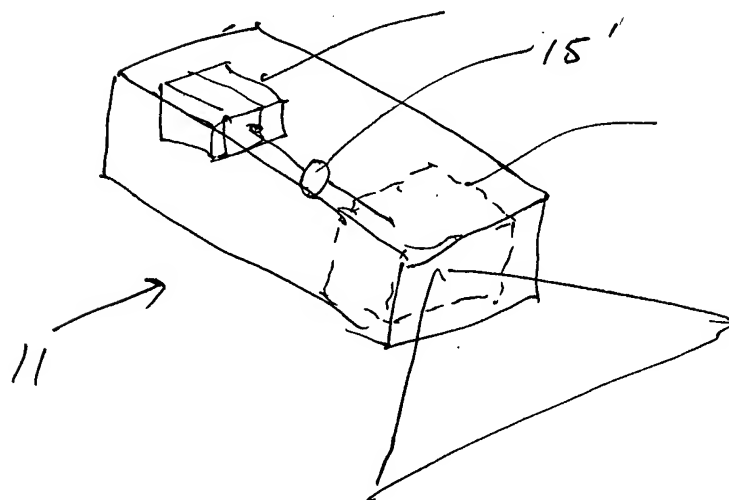


FIG. 1G.16B

PLIM w/
powell lens

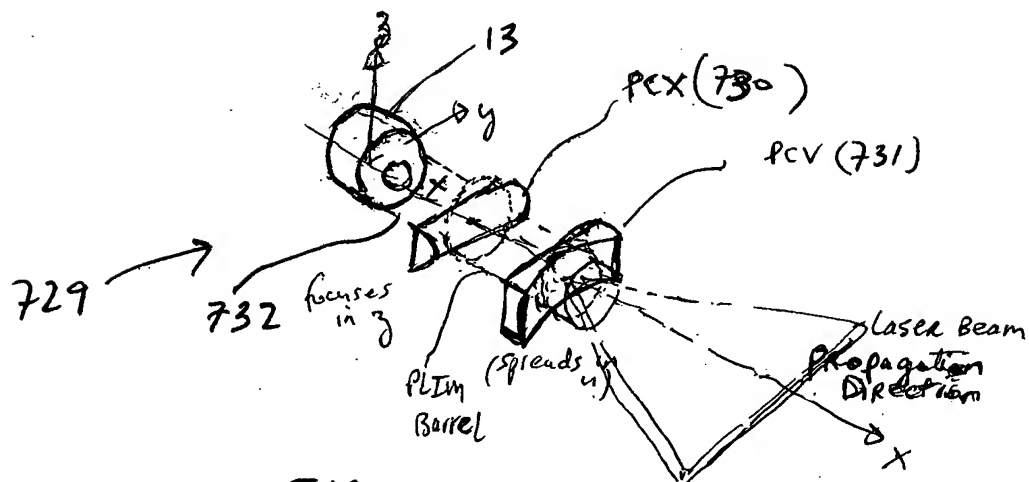


FIG. 16.17A

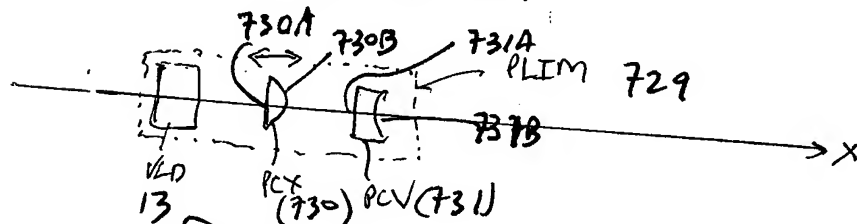


FIG. 16.17B

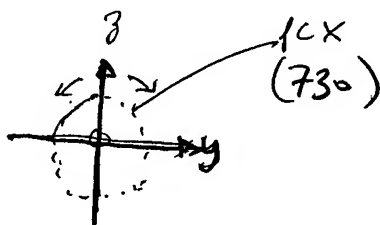


FIG. 16.17C

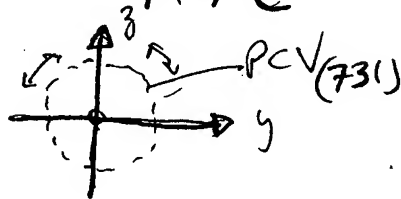


FIG. 16.17D

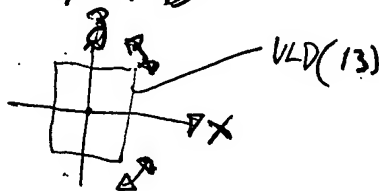


FIG. 16.17E

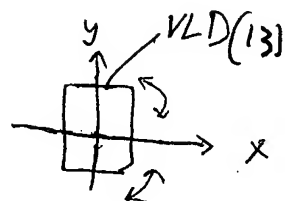
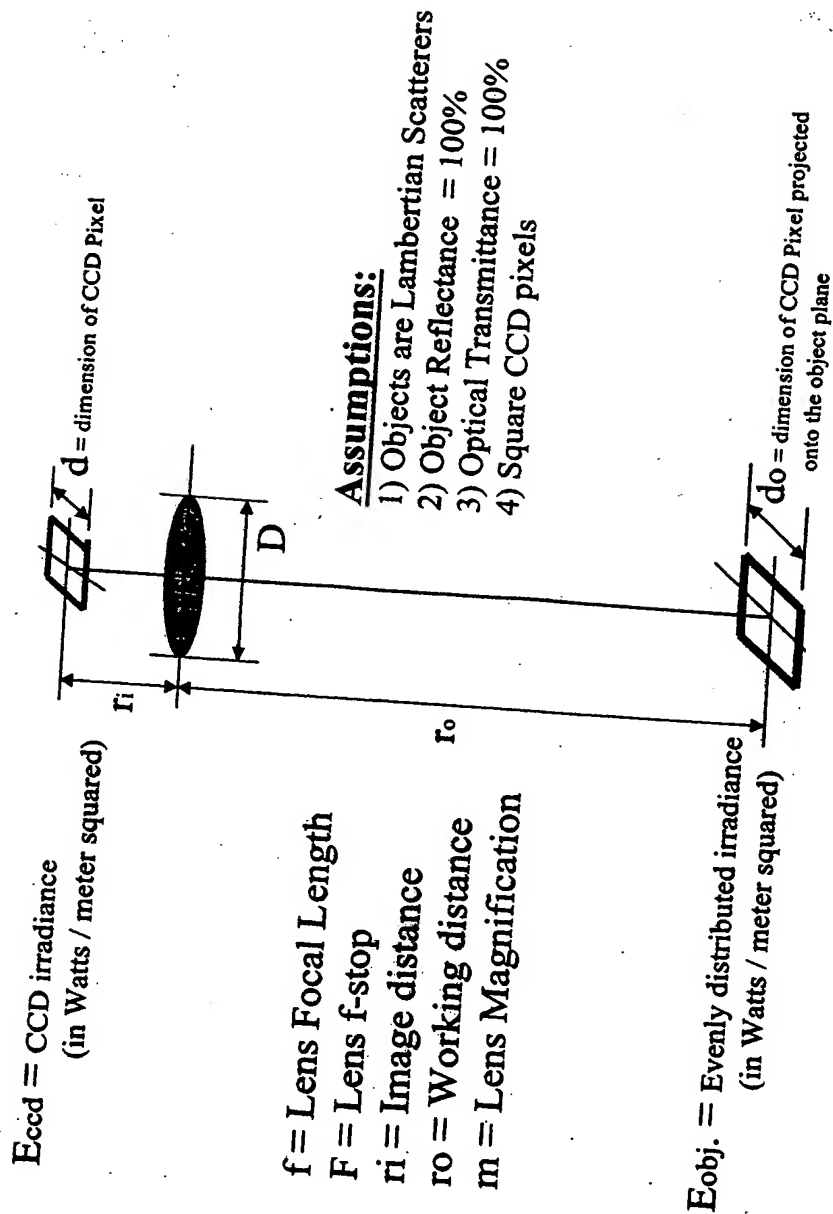


FIG. 16.17F

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CCD-Based Scanner

FIG. 146

FIRST GENERALIZED METHOD
OF REDUCING SPECKLE-NOISE
PATTERNS AT IMAGE
DETECTION ARRAY OF THE
FFD SUBSYSTEM (3)
 (SPMF)

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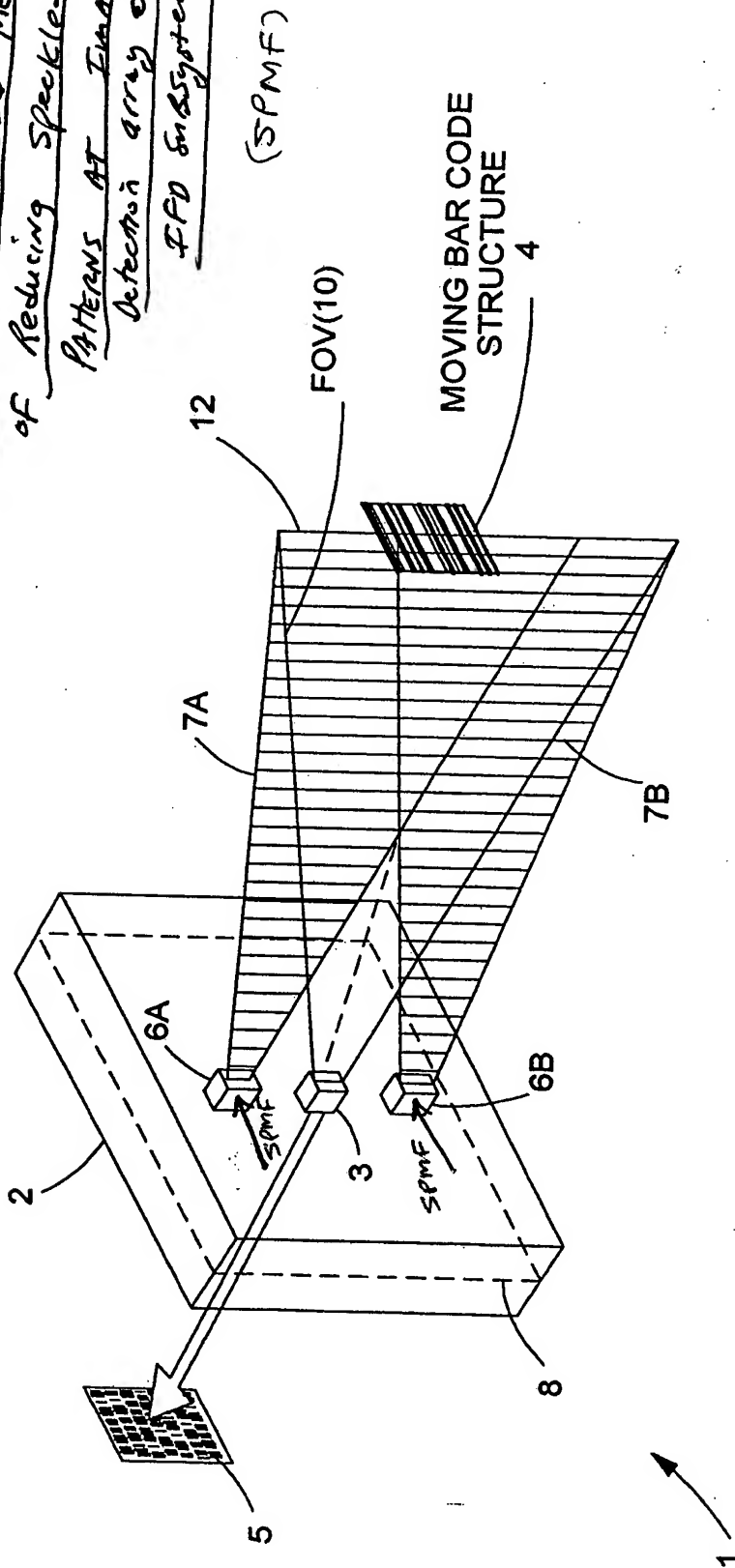


FIG. 1I1

The First Generalized Speckle-Noise Pattern Reduction Method
Of The Present Invention

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial phase of the transmitted PLIB along the planar extent thereof according to a spatial phase modulation function (SPMF) so as to produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the power of the speckle-noise pattern observed at the image detection array.

FIG. 1I2B

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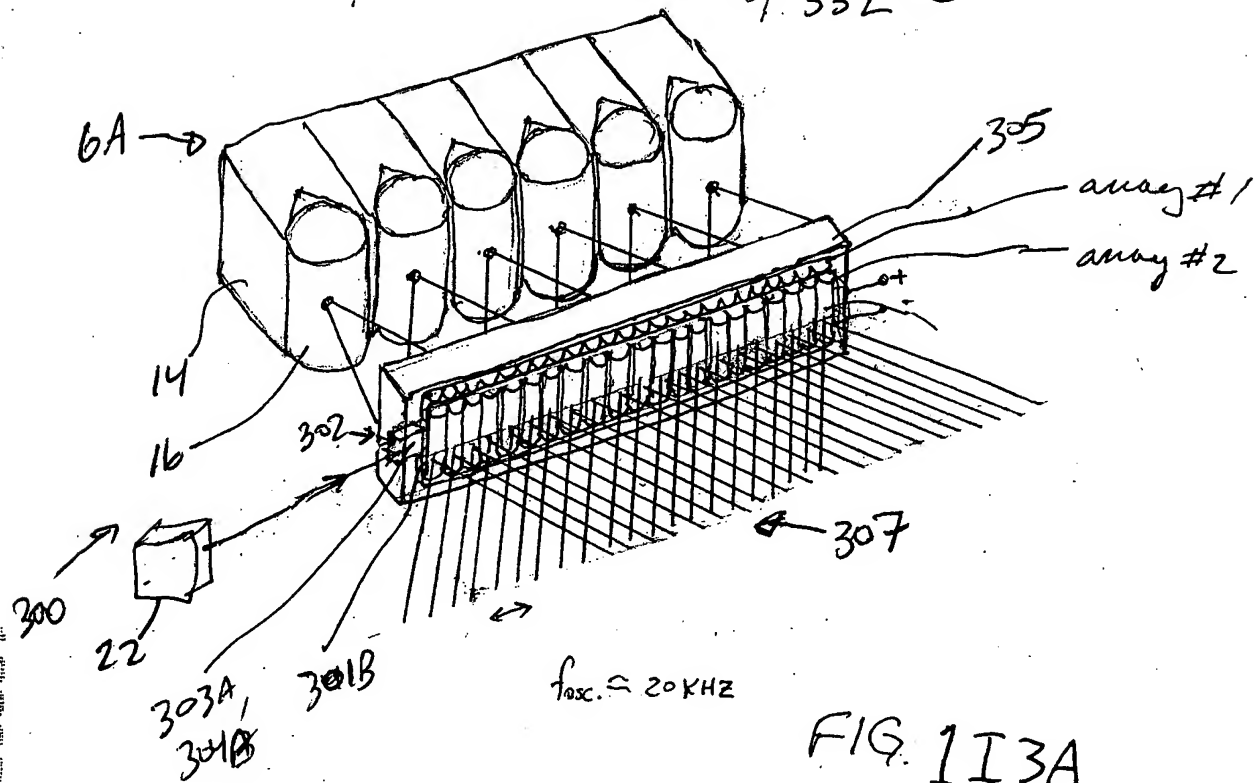


FIG. 1I3A

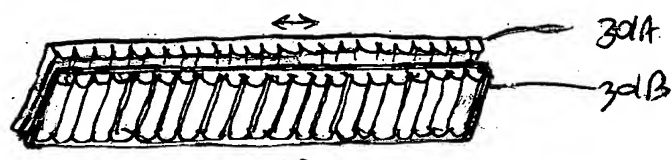


FIG. 1I3B



FIG. 1I3C

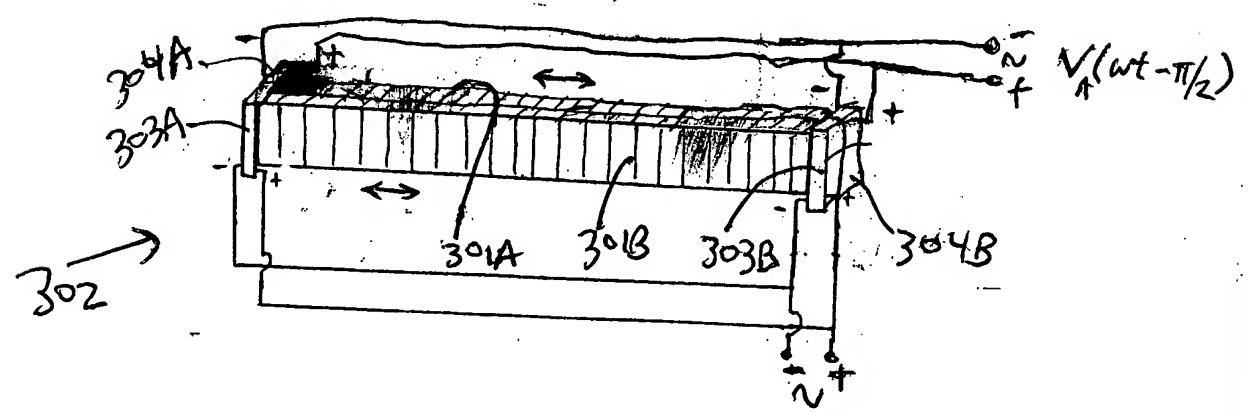
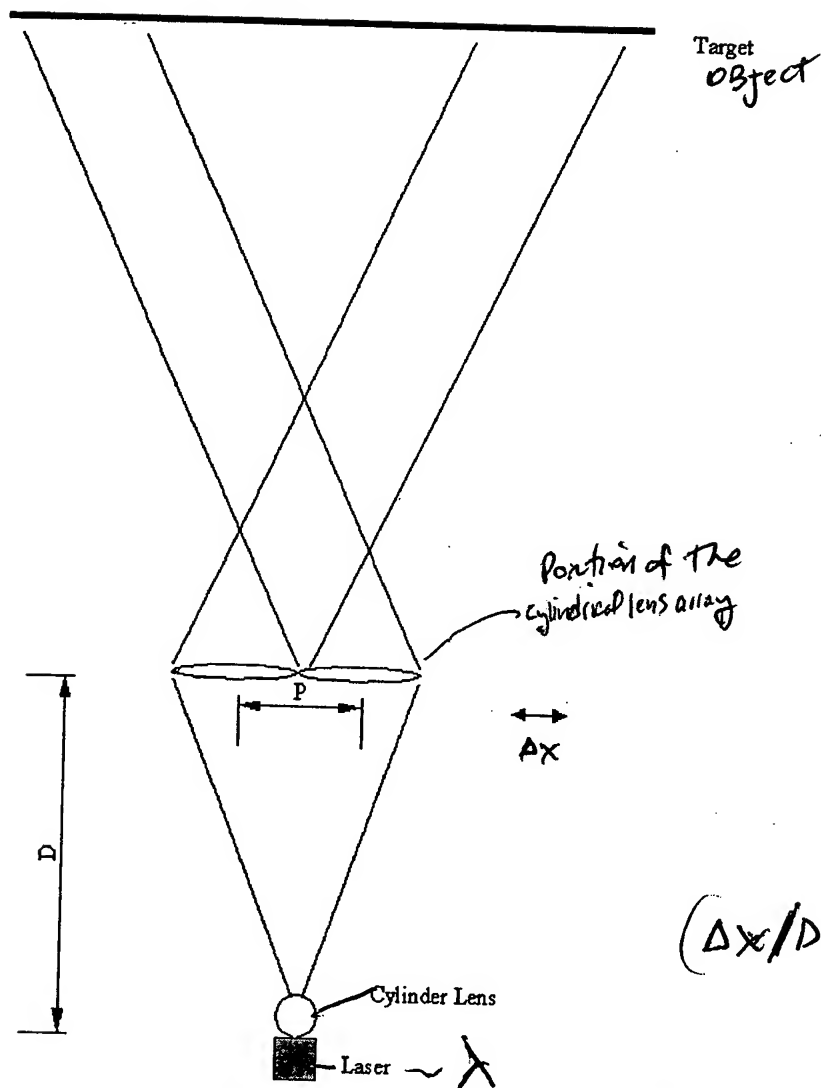


FIG. 1I3D

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$$(\Delta x / D) P = \lambda$$

Figure 1

$$\Delta x \geq \frac{\lambda \cdot D}{P}$$

FIG. 1I3E

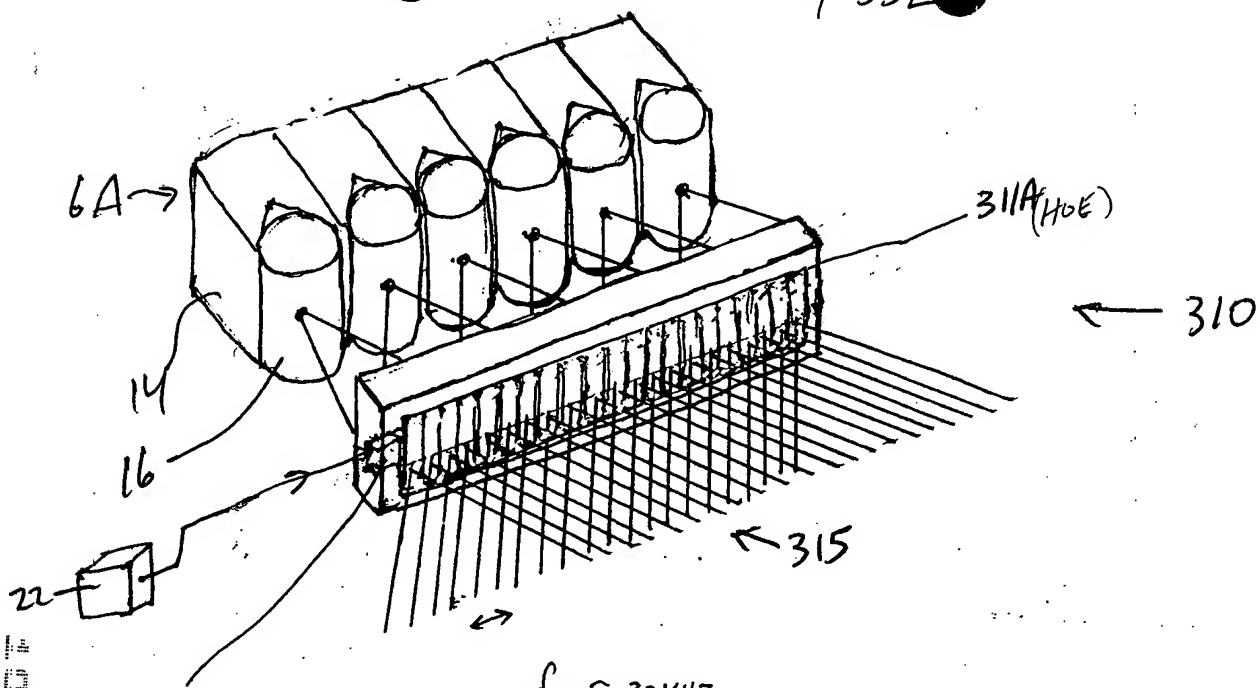
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FIG. 1I3F



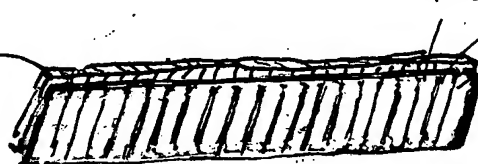
FIG 1I3G



$f_{osc} \approx 20 \text{ KHZ}$

FIG. 1I4A

array #1



311A

311B

holographically-fabricated cylindrical lens array

FIG. 1I4B

array #2

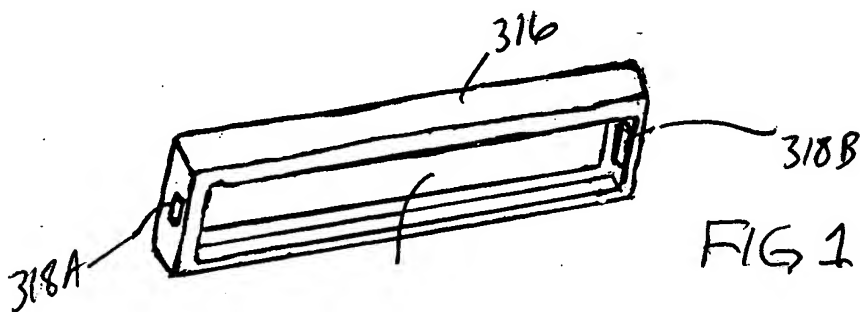
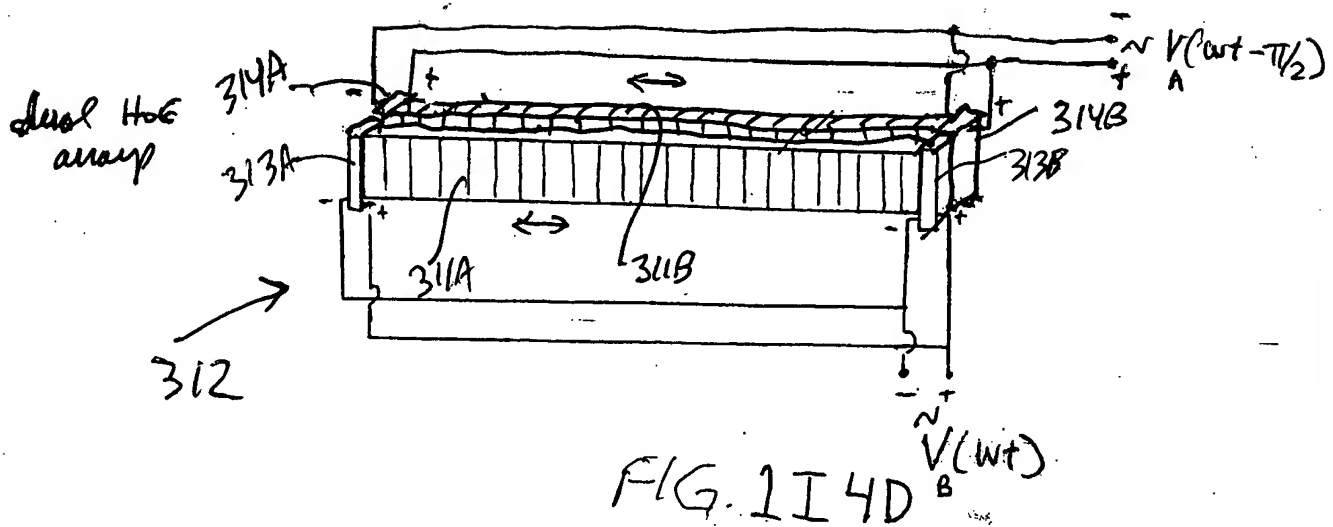
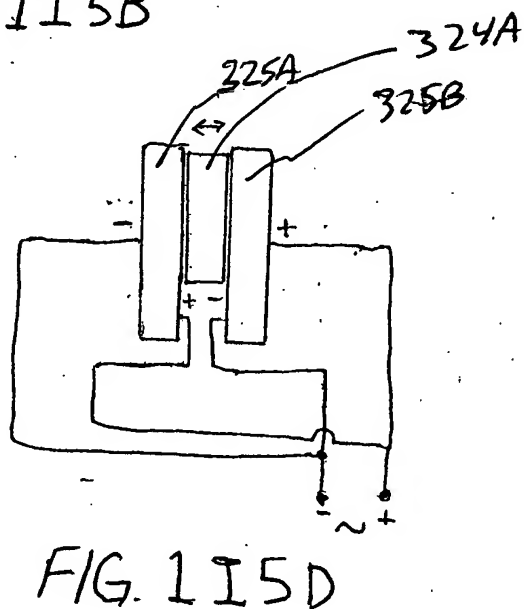
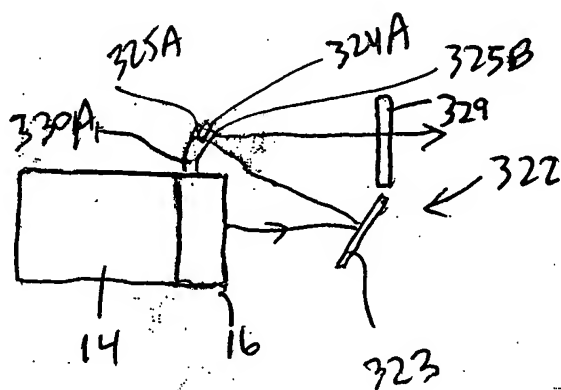
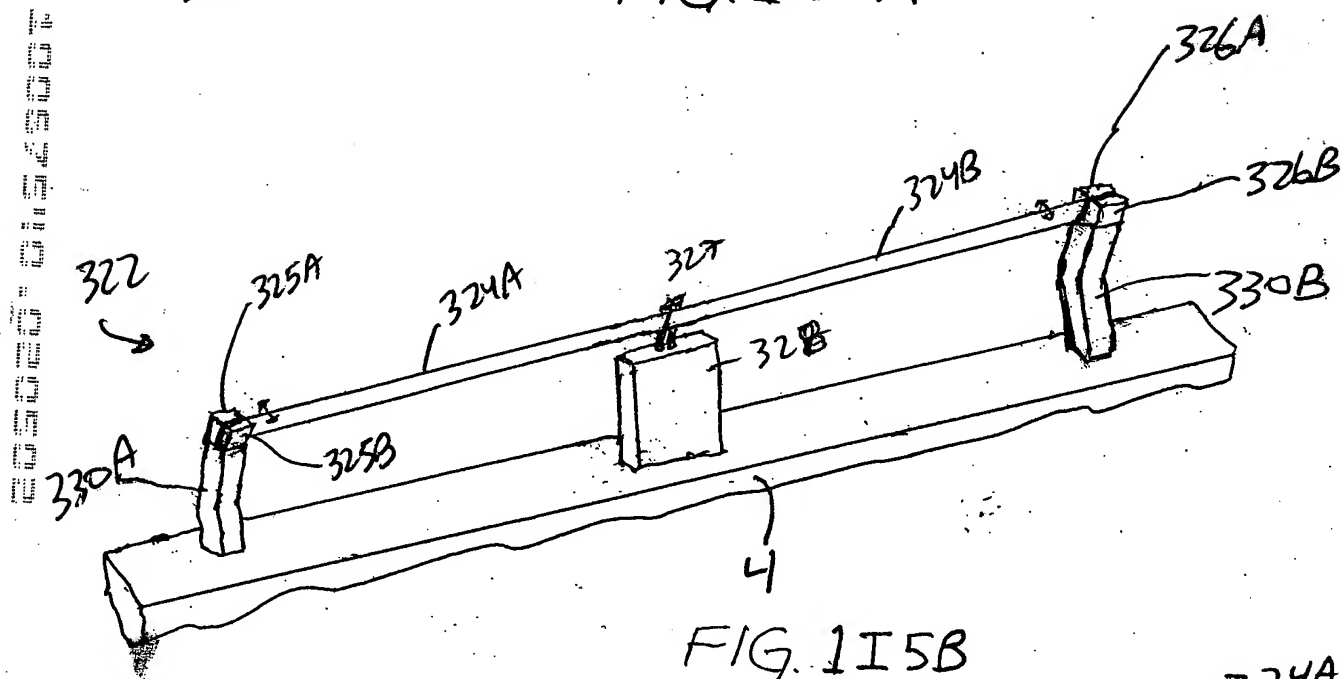
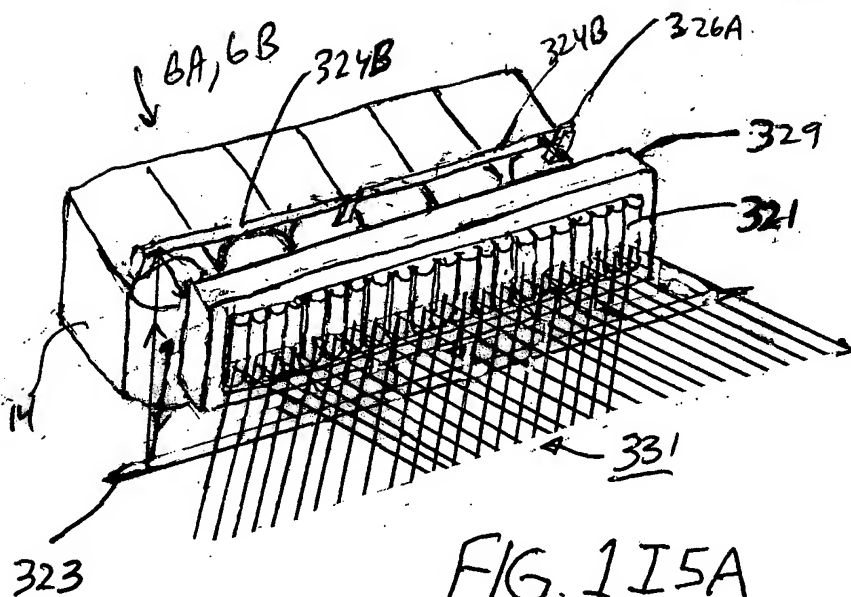
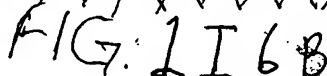
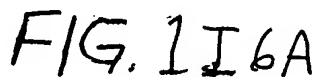
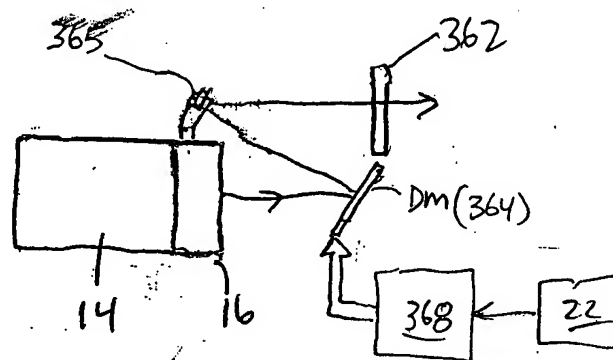
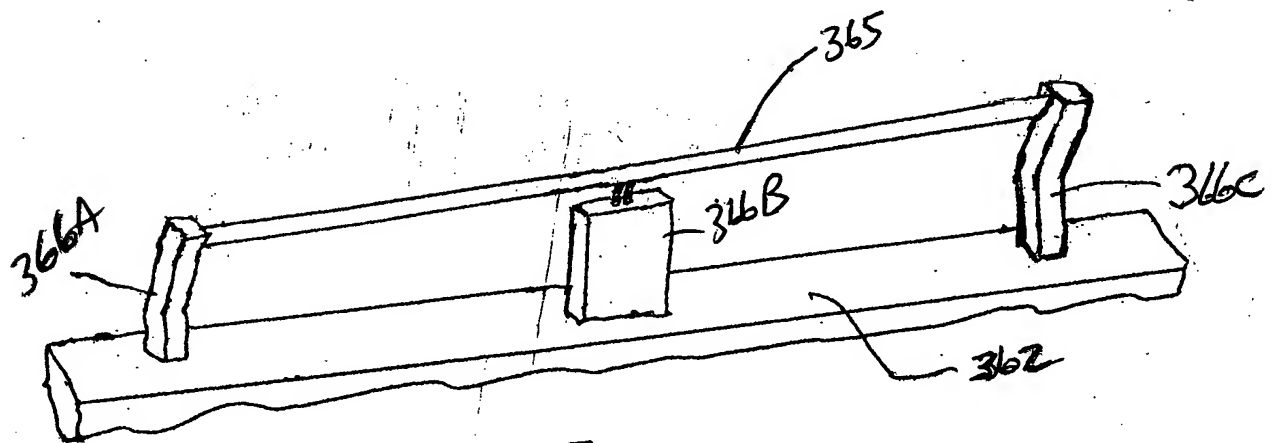
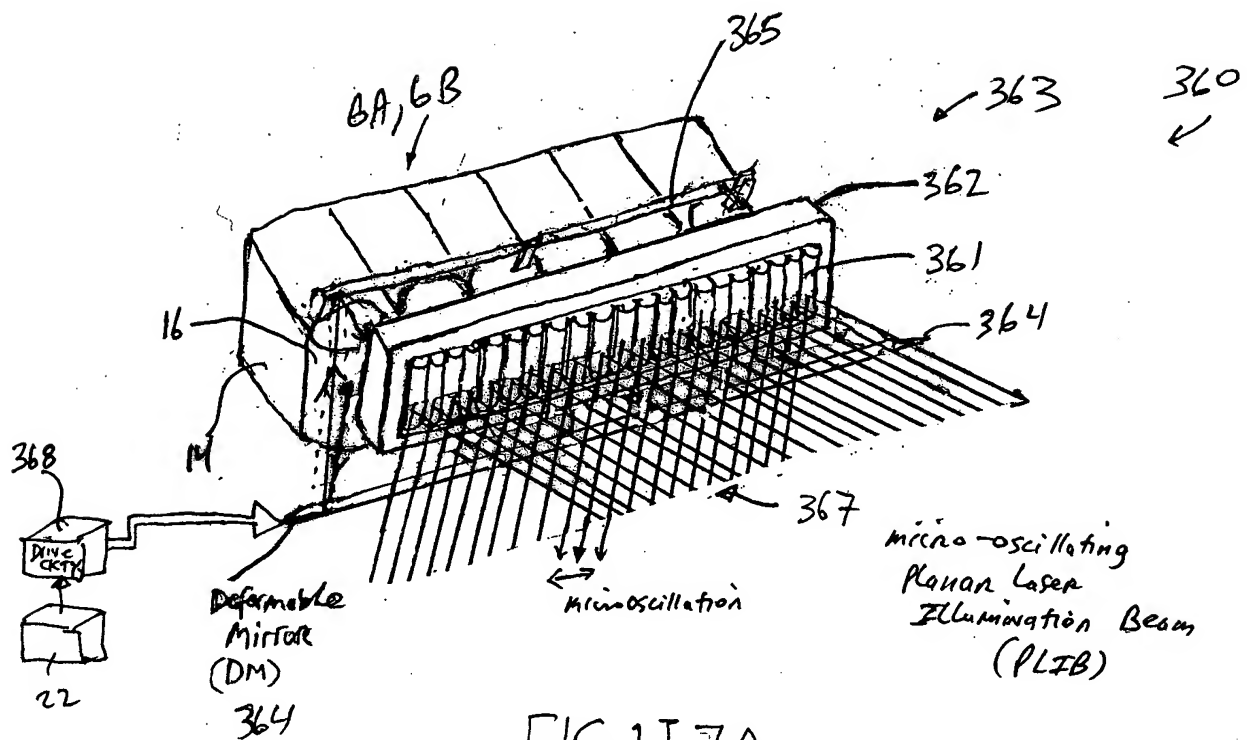


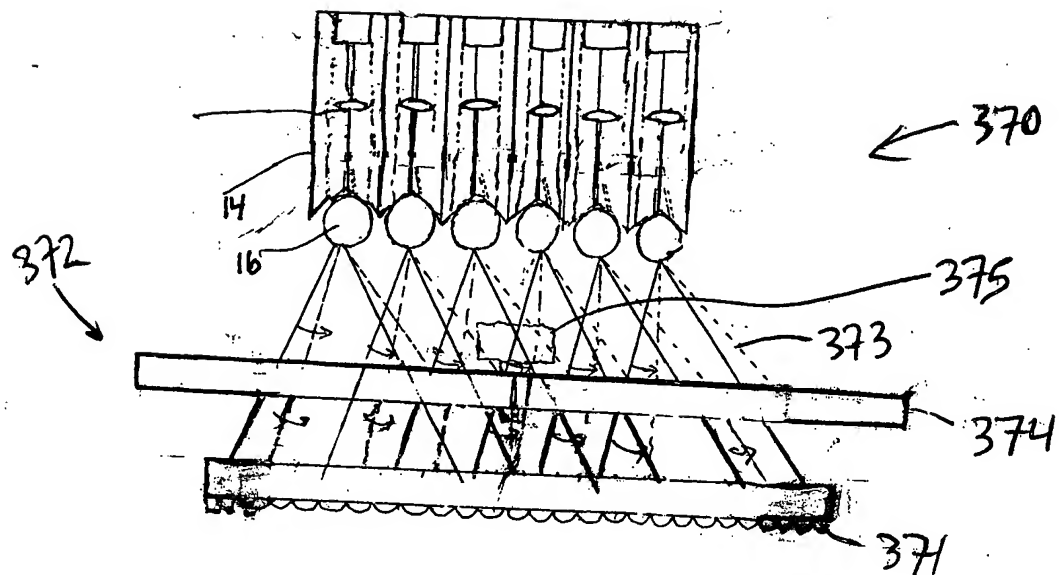
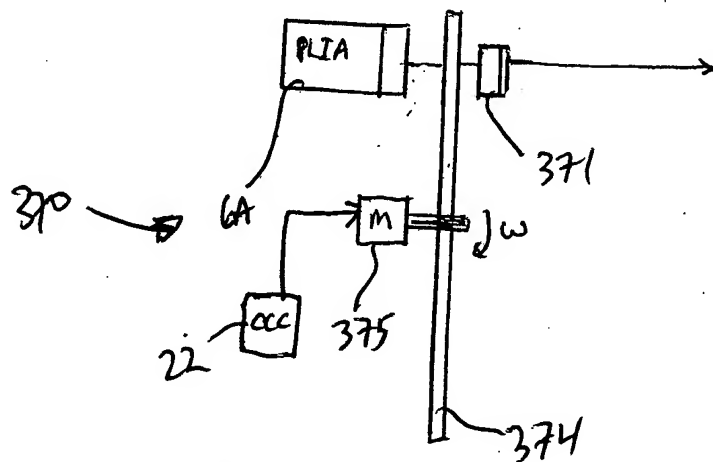
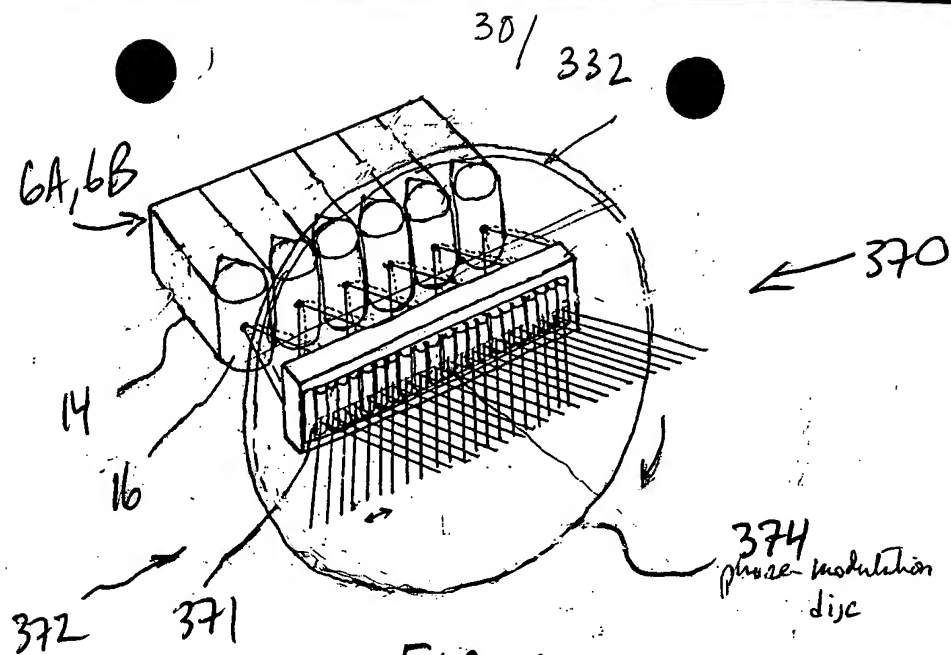
FIG. 1I4C

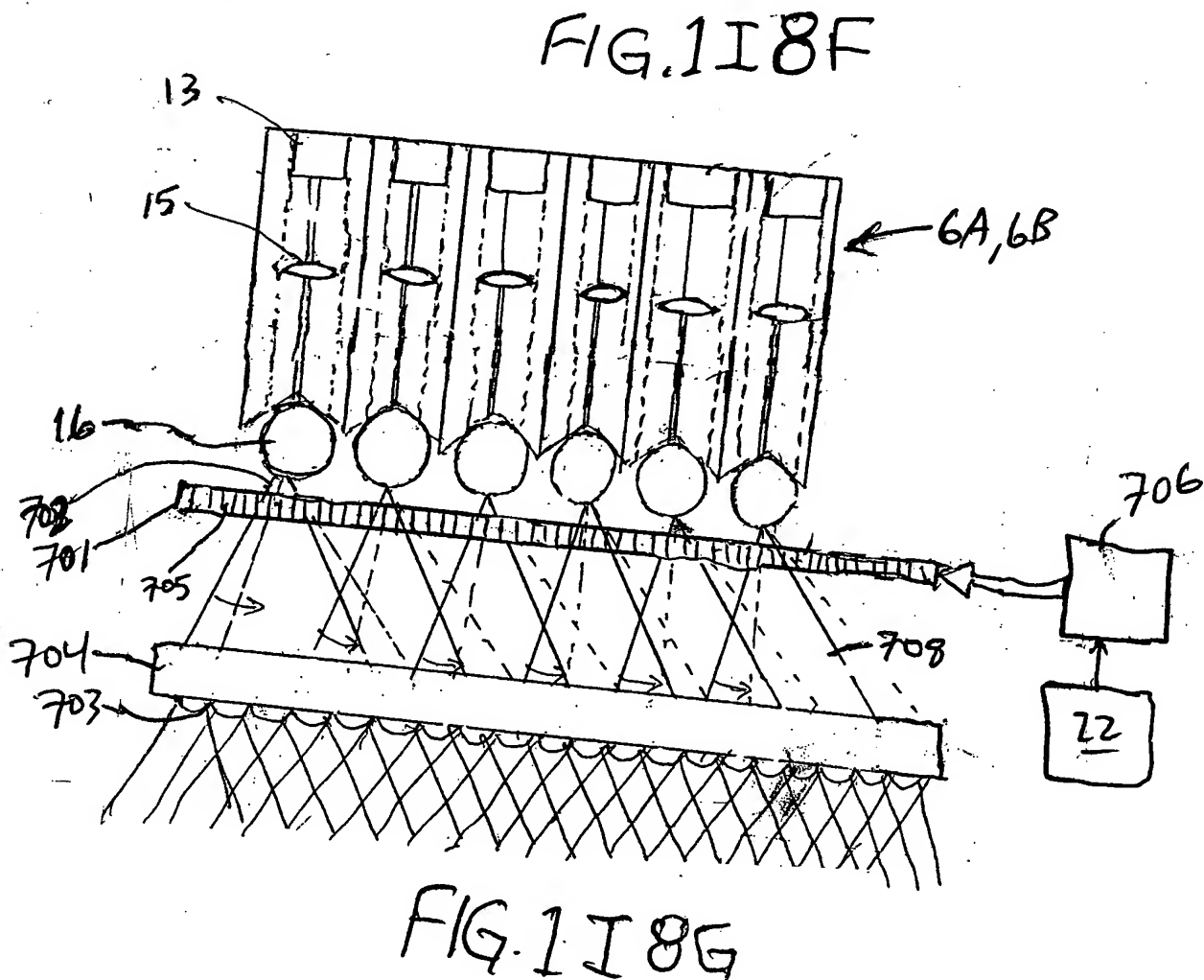
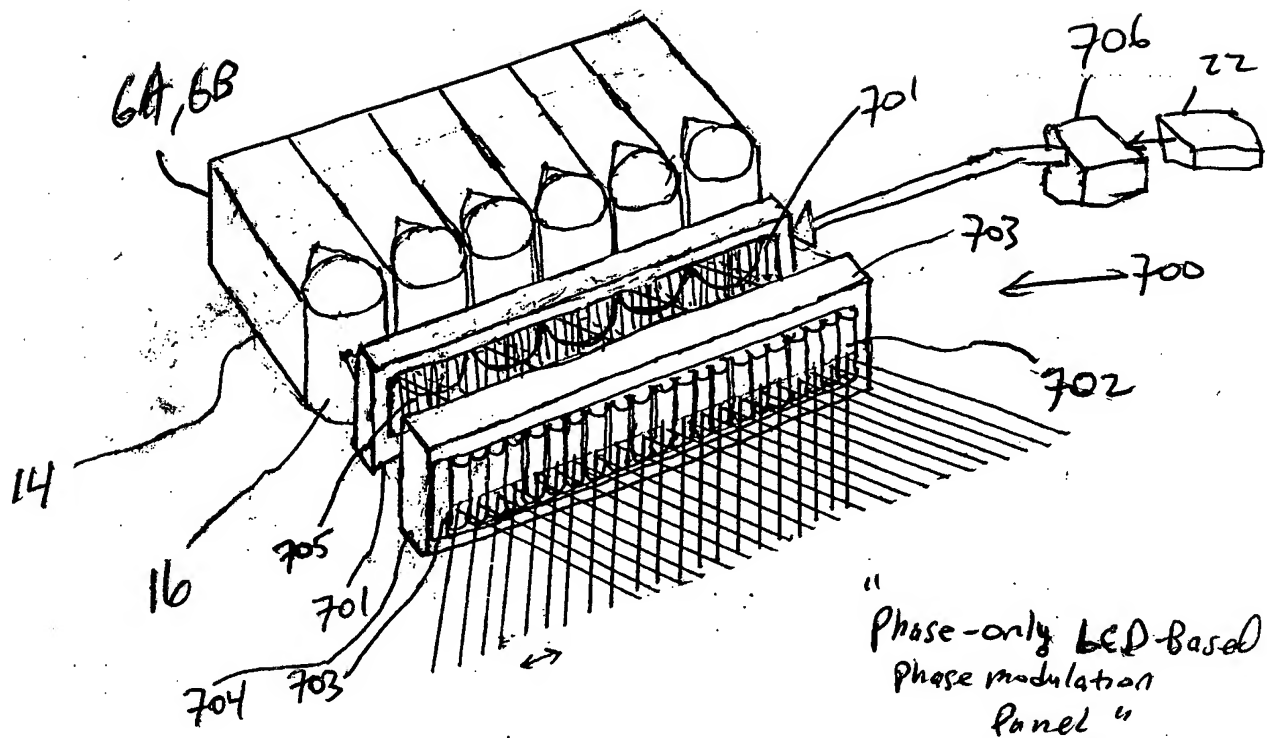












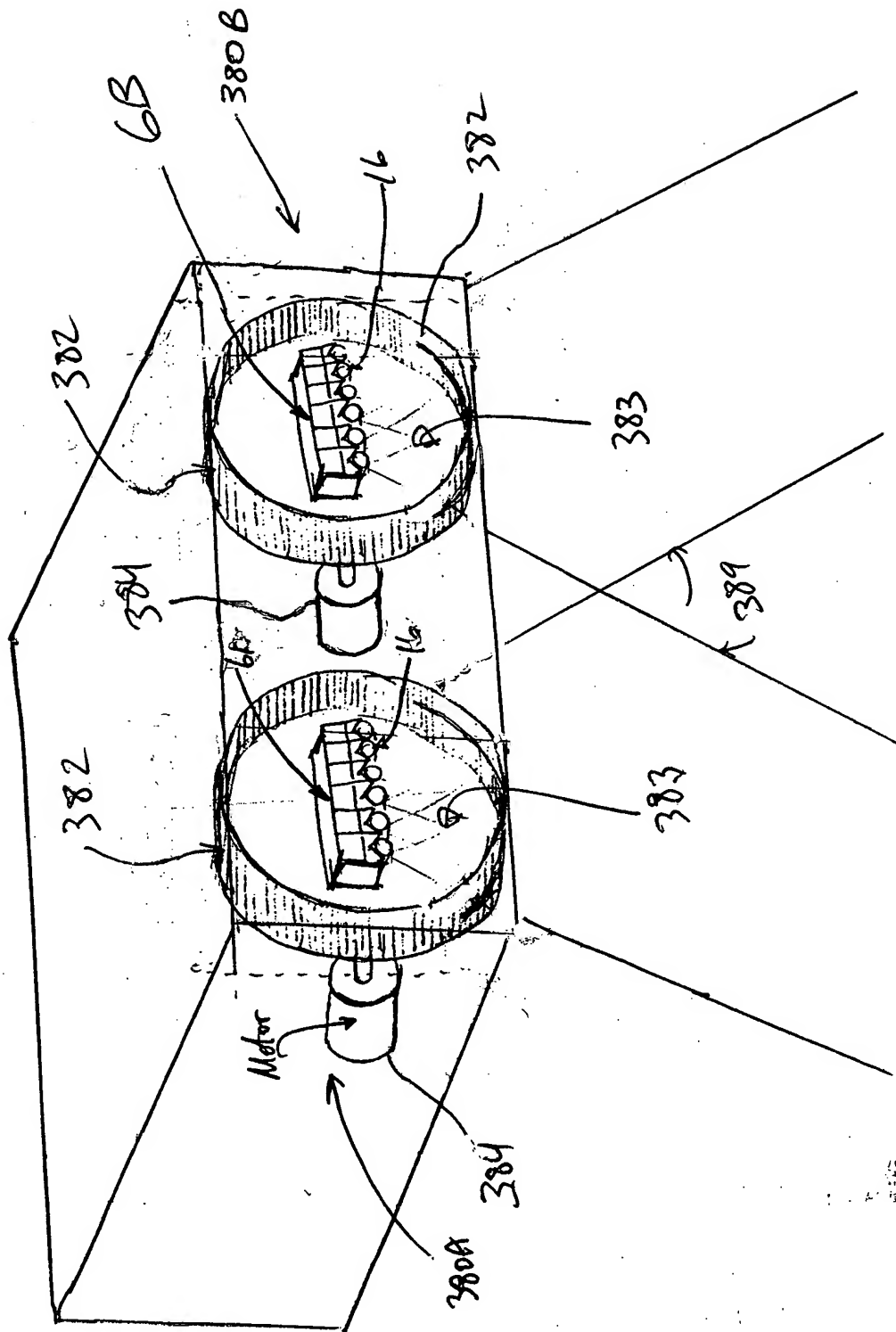


FIG. 1I 9A

$\begin{array}{ccccccc} \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \\ | & | & | & | & | & | & | \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ | & | & | & | & | & | & | \\ \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \end{array}$

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Optical Specifications:

30 cylindrical lens (lenses) per linear inch
 focal length \approx 2.0 millimeters
 diameter of lenslets carousel \approx 4
 acrylic material

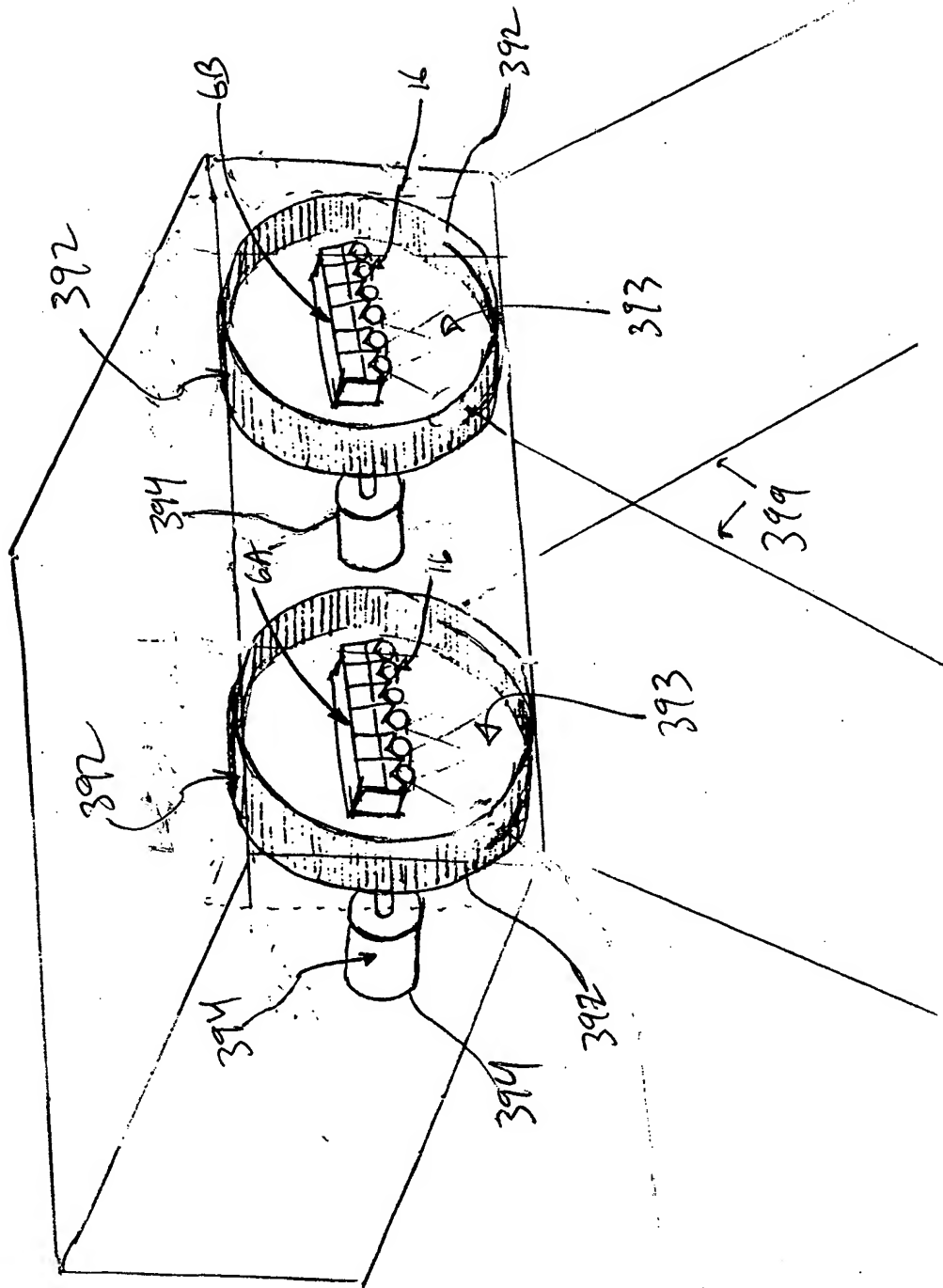


FIG. 1I10A

665000 01523000

Optical Specifications

- 30 cylindrical lens (lenses) per linear inch
- total length is 2.0 millimeters
- diameter of Centurion Carousel is 4 inches

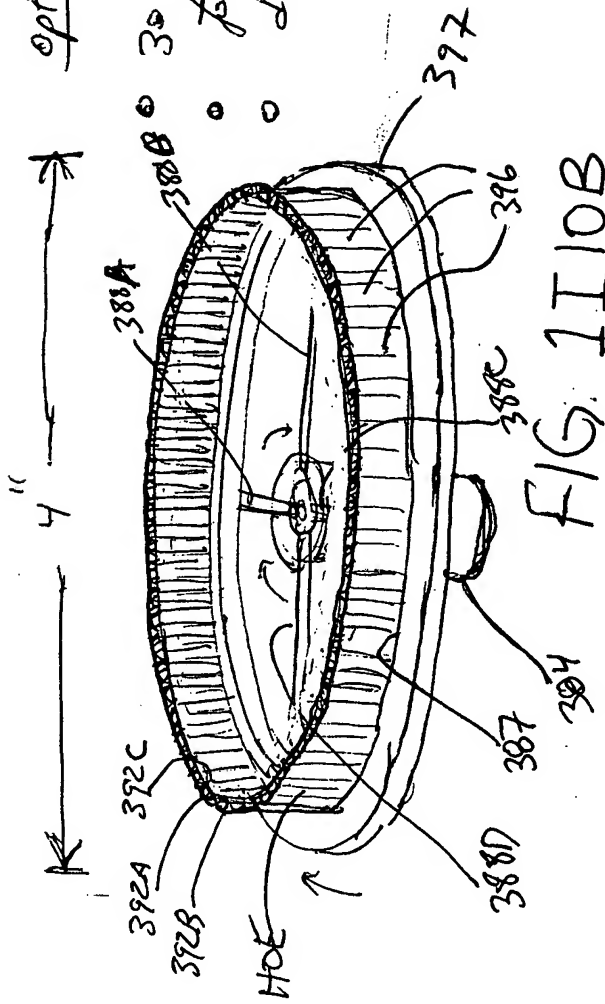


FIG. 1110B

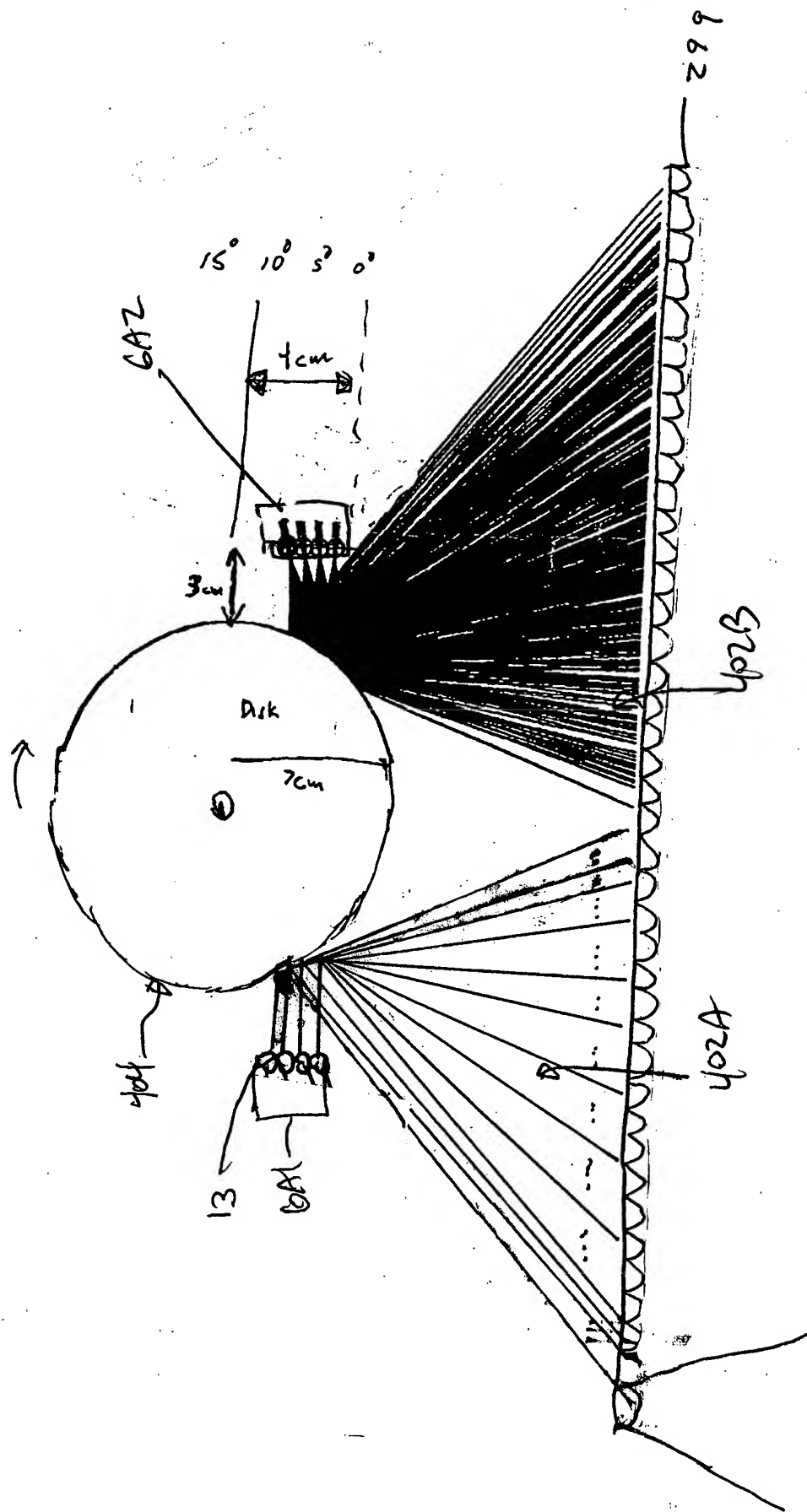


FIG. 111C

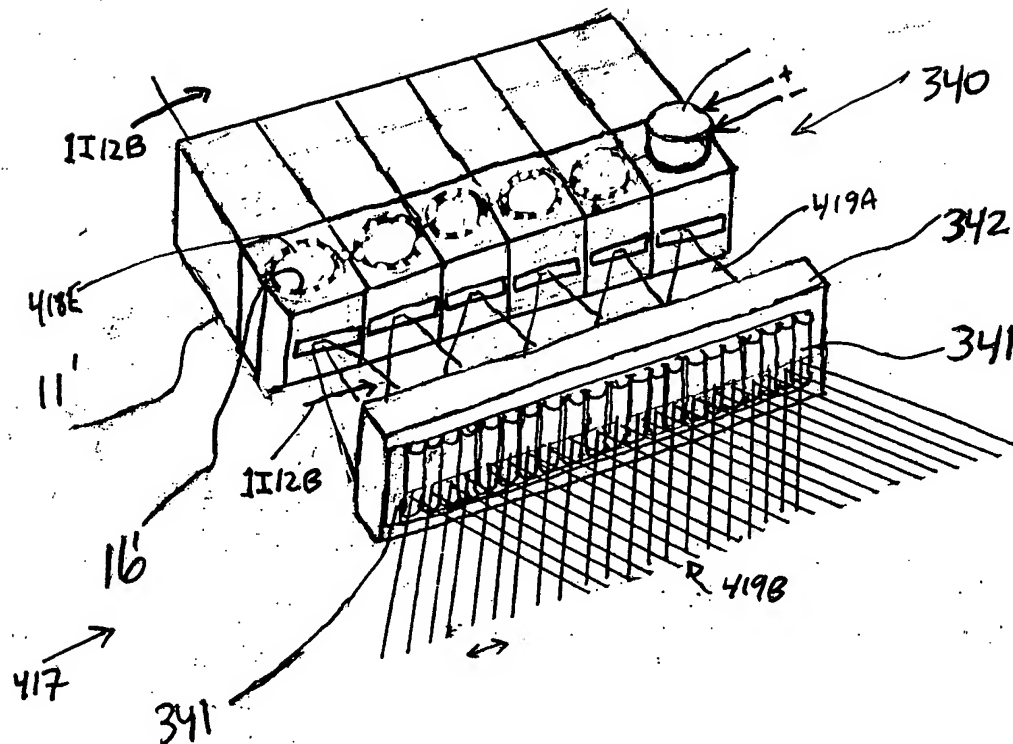


FIG. 1I12A

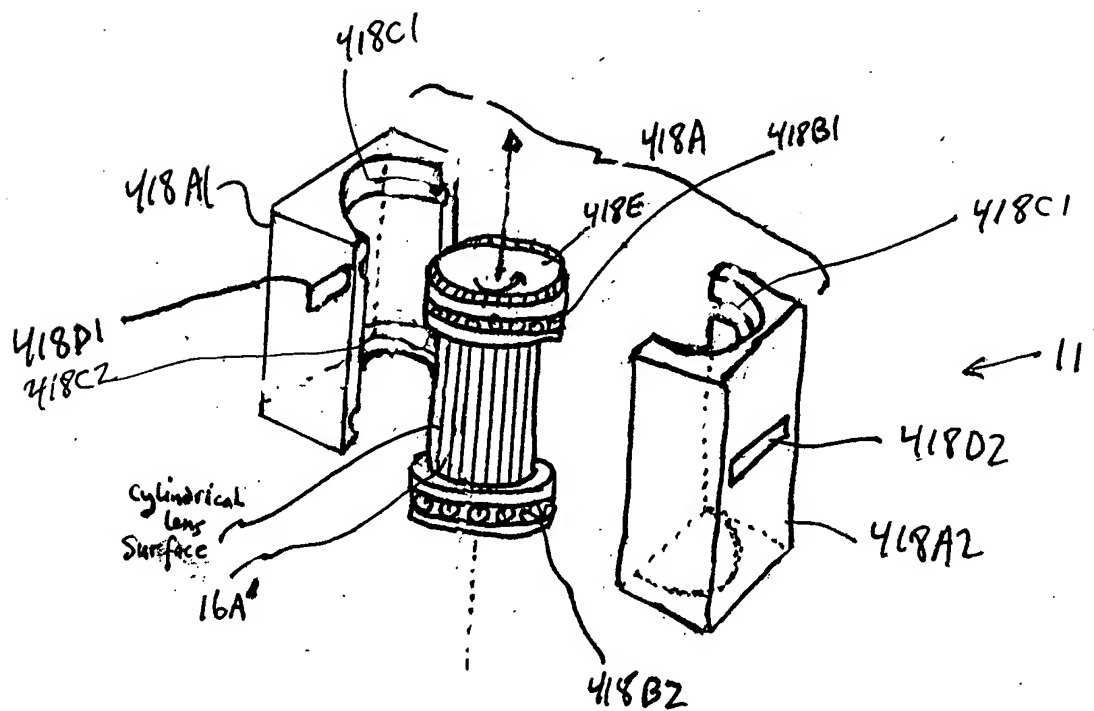


FIG. 1I12B

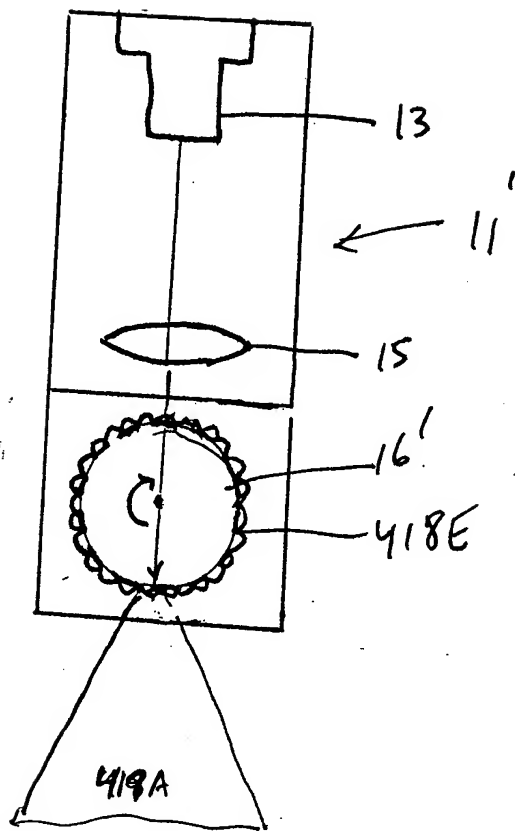


FIG. 1I/2C

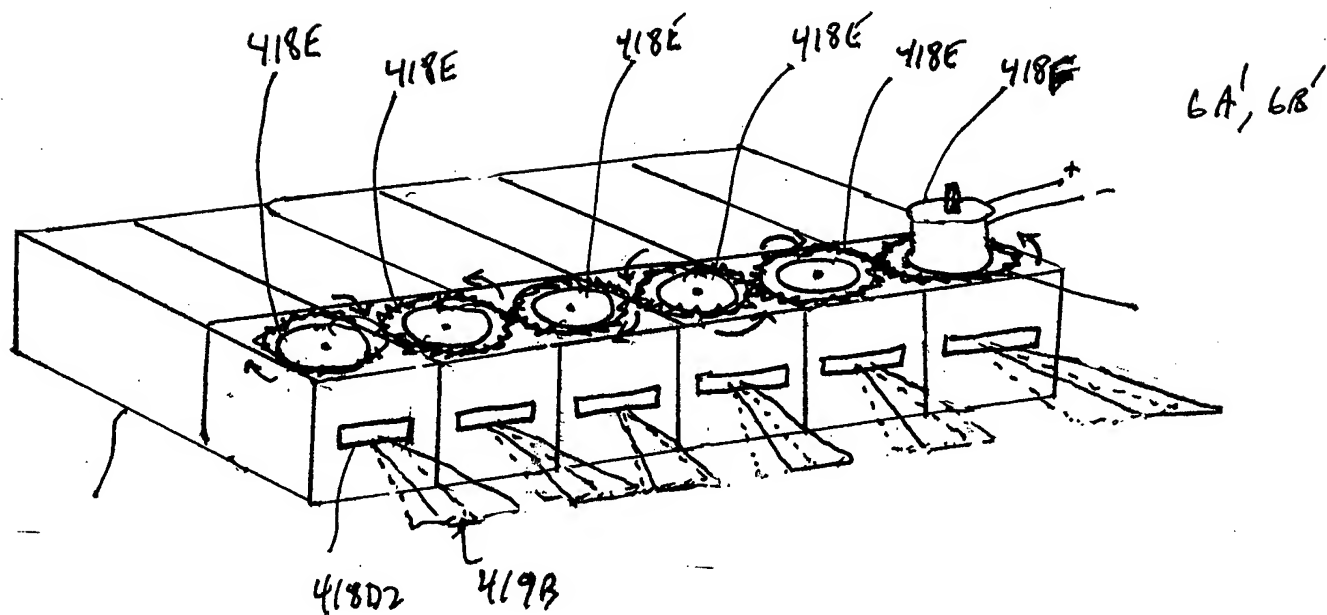


FIG. 1I/2D

Second Generalized Method of
Reducing Spackle-Noise Patterns
at Image Detection Stage
of the FFD Subsystem (3)

(TIME)

2

3

6A

6B

FOV(10)

MOVING BAR CODE STRUCTURE 4

7A

7B

8

5

FIG. 1113

(The page contains faint, illegible markings or bleed-through from the reverse side.)



FIG. 1I 13A

The Second Generalized Speckle-Noise Pattern Reduction Method
Of The Present Invention

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal intensity of the transmitted PLIB along the planar extent thereof according to a temporal intensity modulation function (TIMF) so as to

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

FIG 1I13B

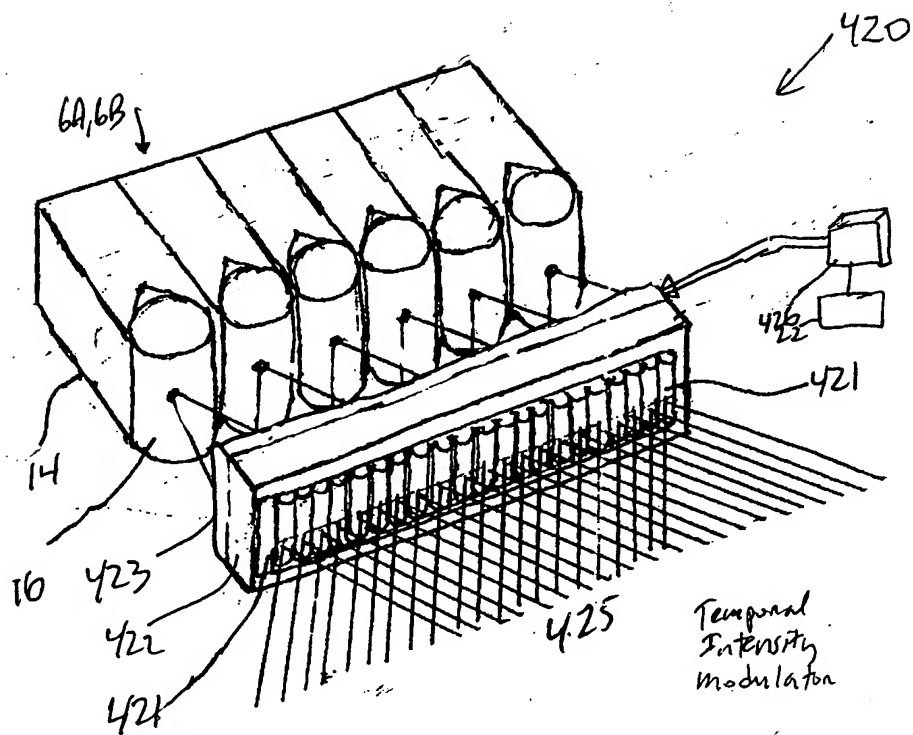


FIG. 1I14A

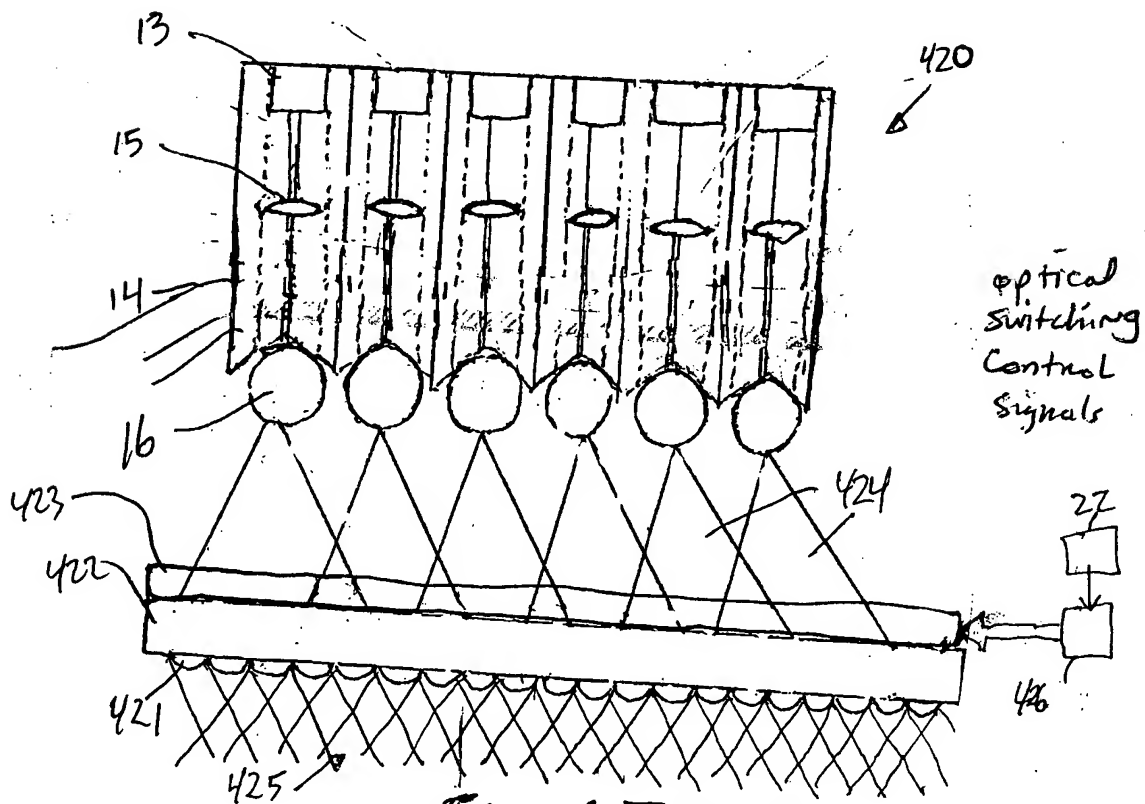
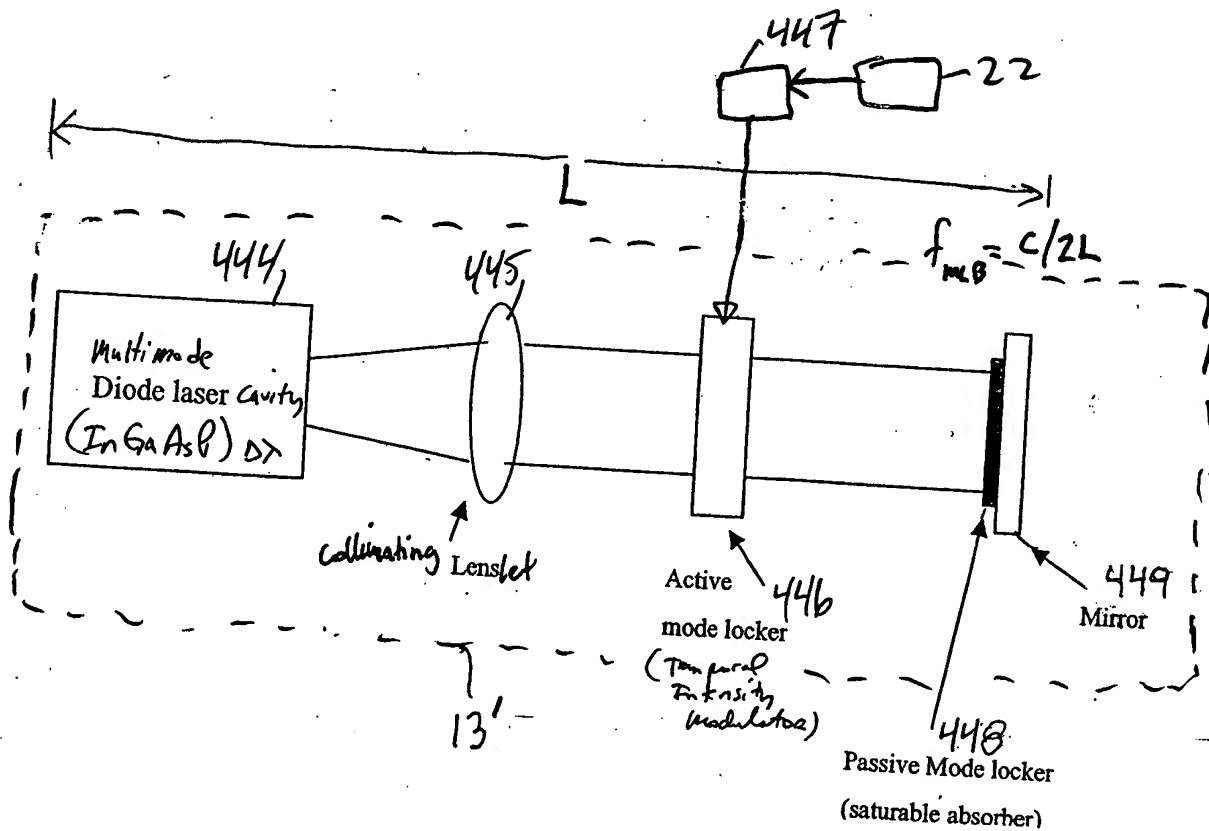
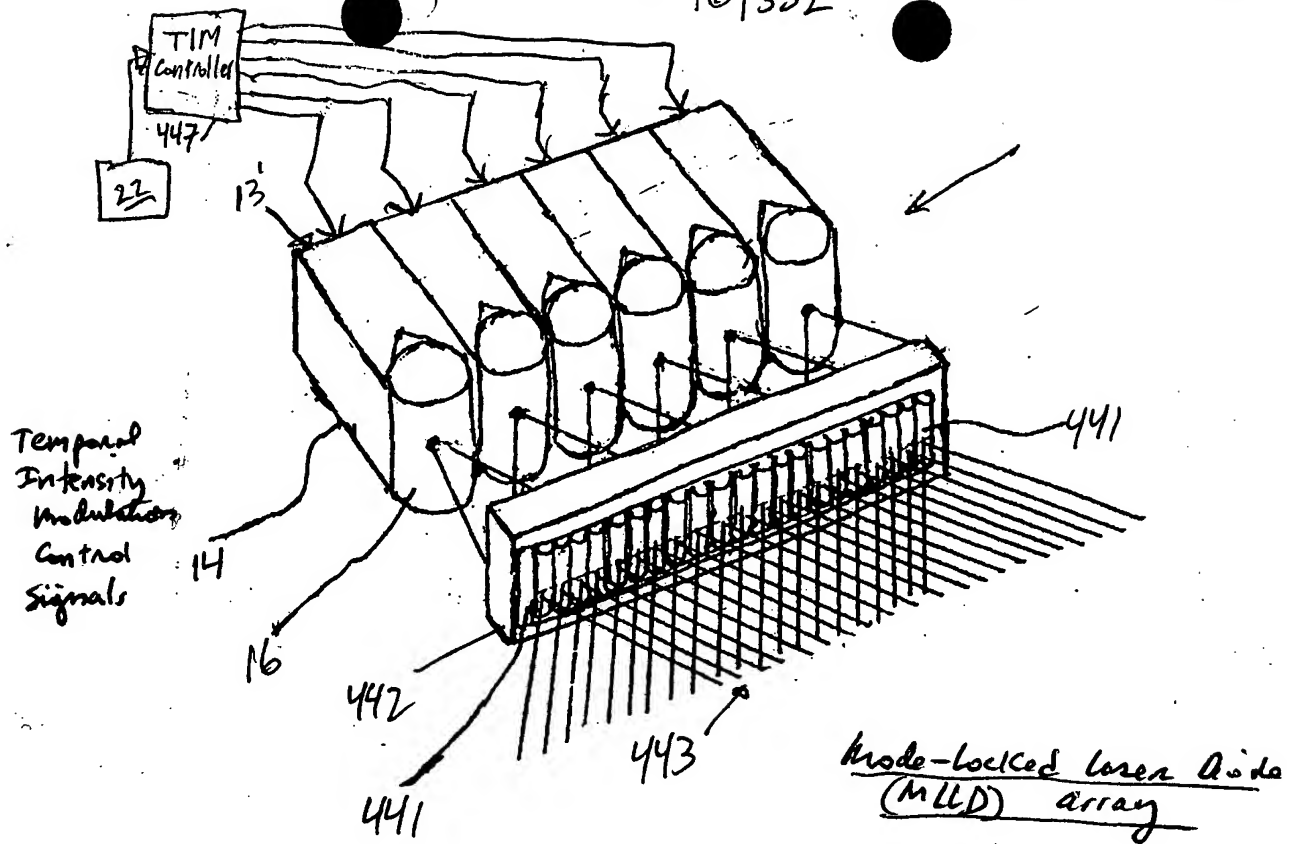


FIG. 1I14B

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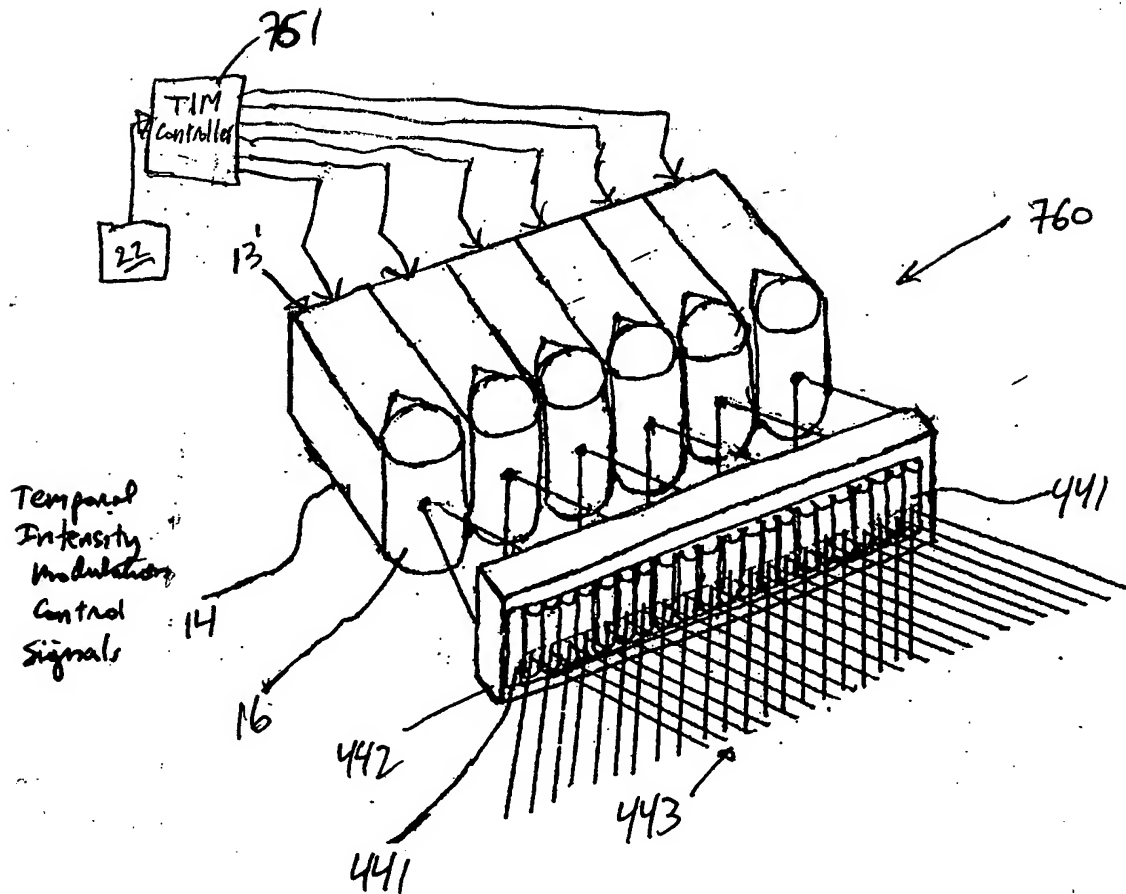


FIG. 1I15C

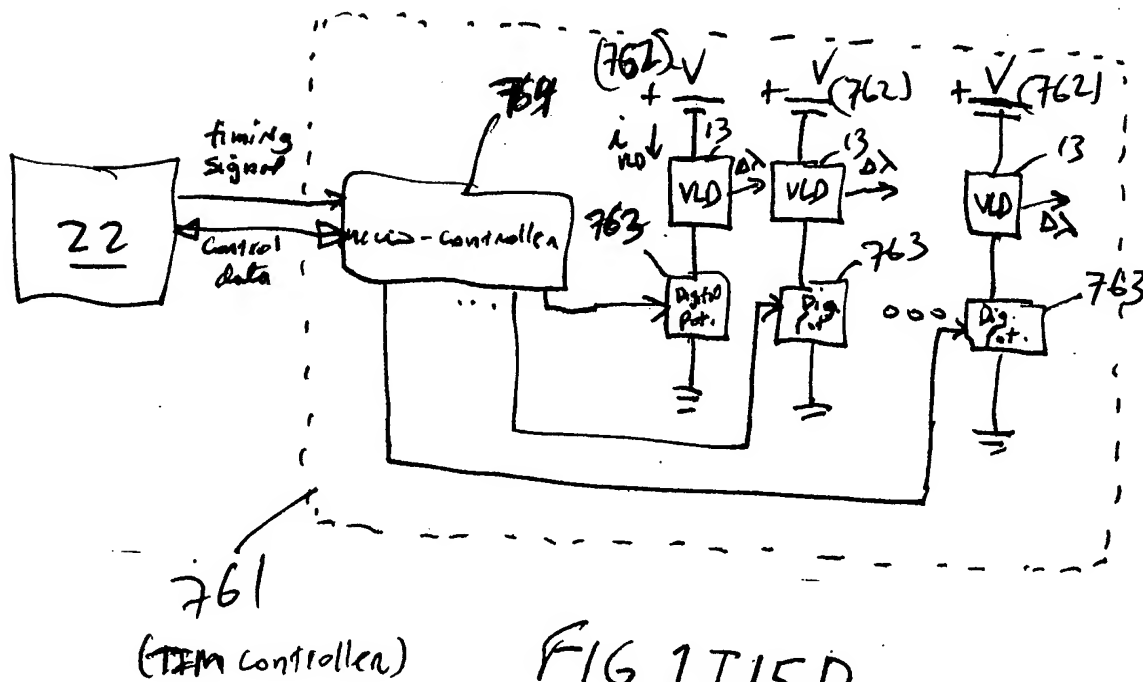


FIG. 1I15D

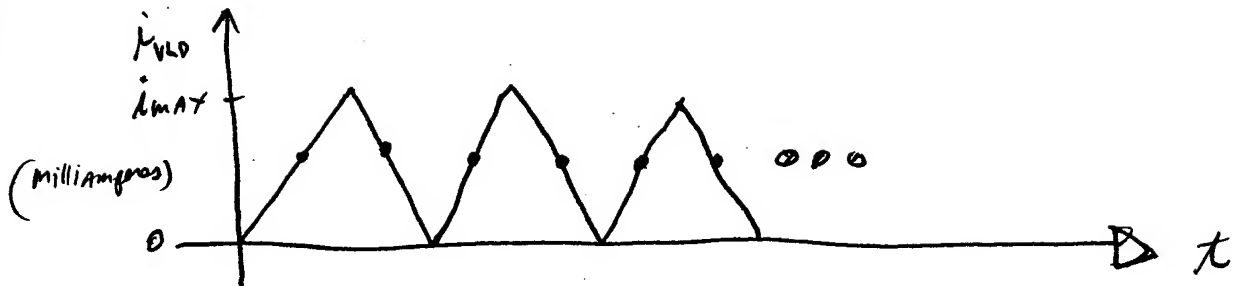


FIG. 1I15E

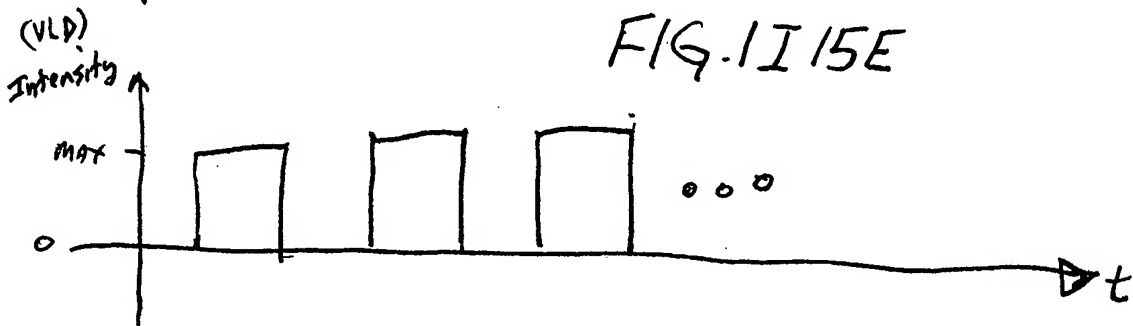


FIG. 1I15F

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332 332 332

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Third Generalized Method of
Reducing Speckle-Noise Patterns
at Image Detection Array
of the FFD Subsystem (3)

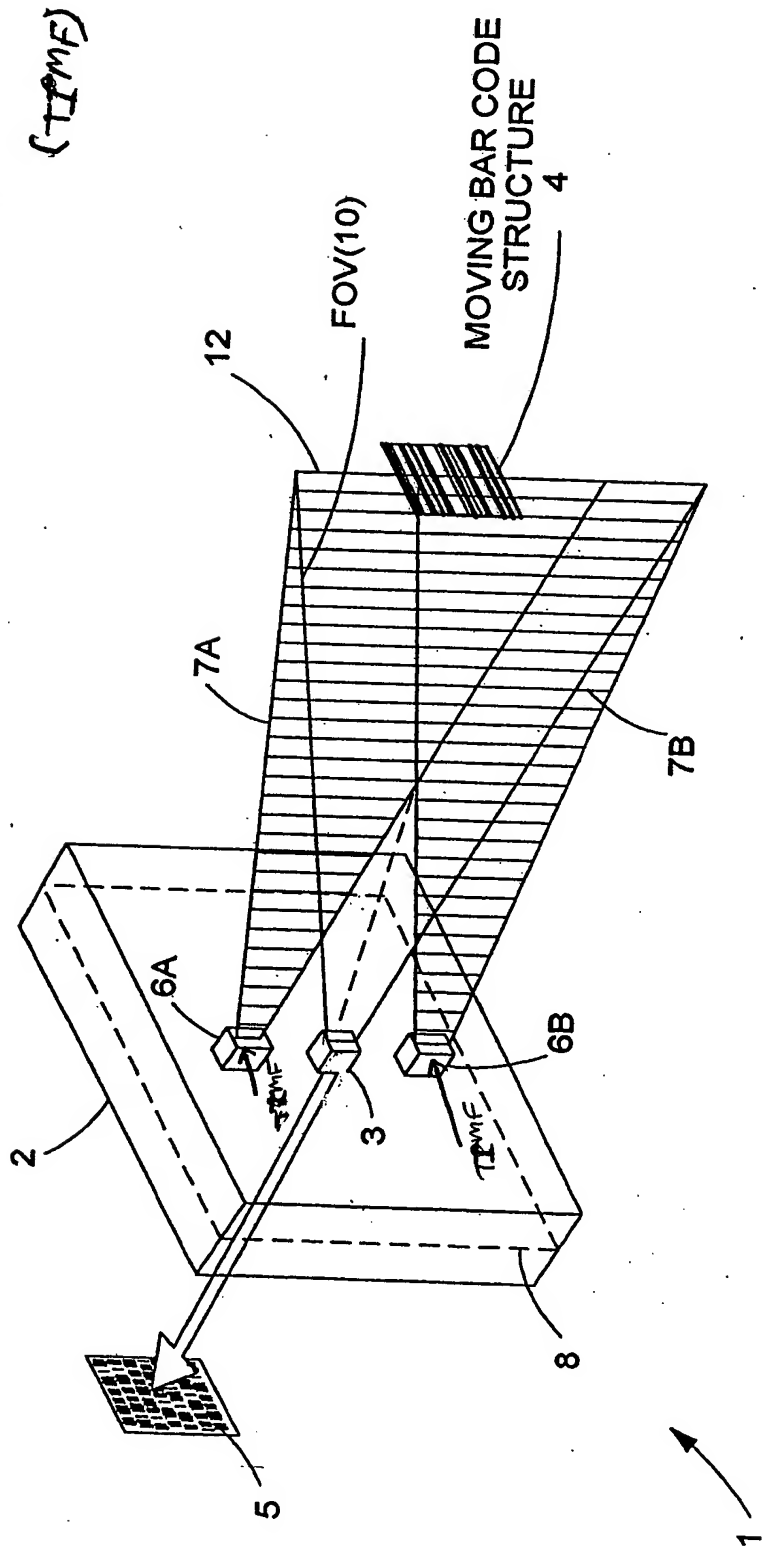


FIG. 11 16

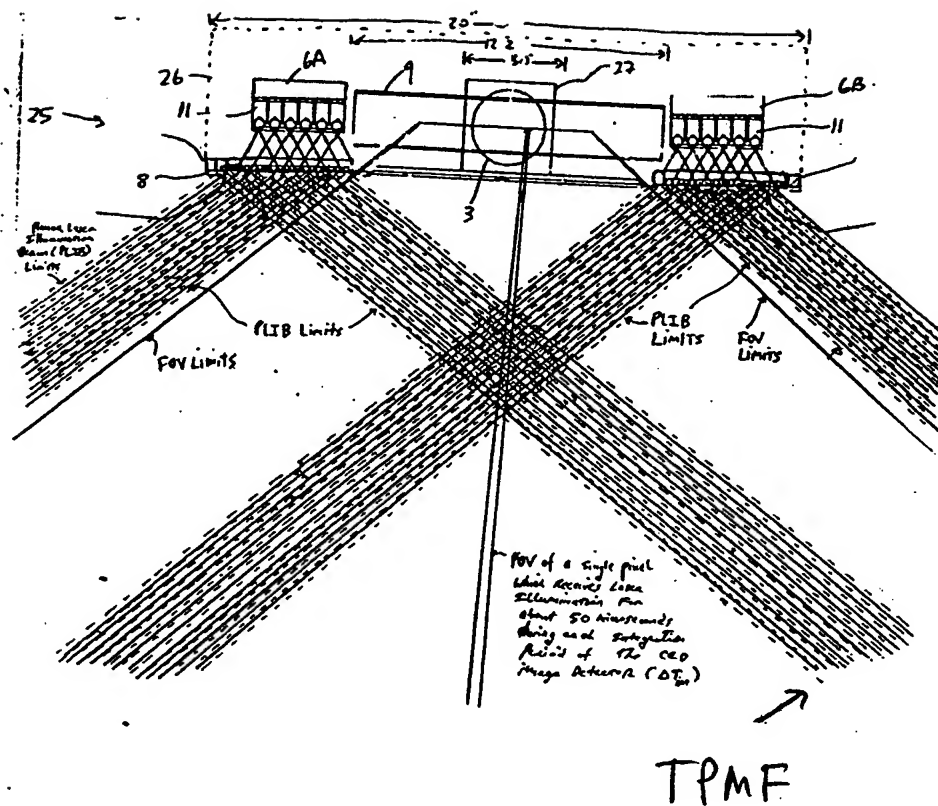


FIG. 1 I 16A

Third Generalized Speckle-Noise Pattern Reduction Method
Of The Present Invention

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal *phase* of the transmitted PLIB ~~along the planar extent thereof~~ according to a *temporal phase* modulation function (TPMF) so as to:

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

↓

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

FIG 1I/6B

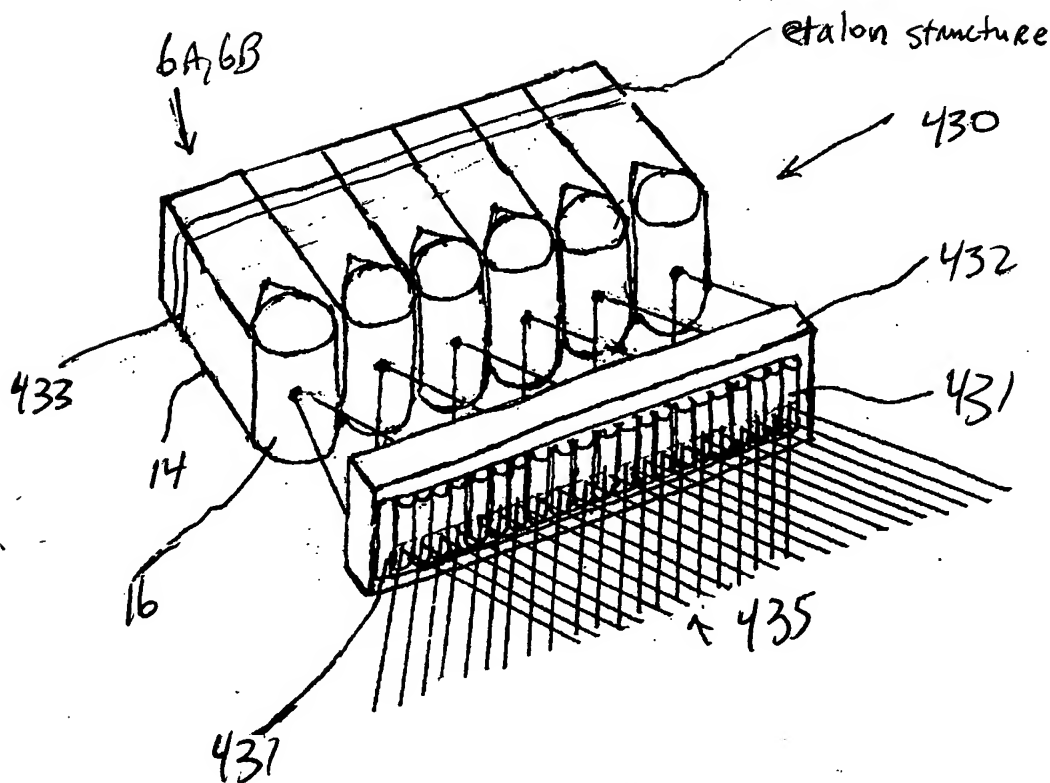


FIG. 1I17A

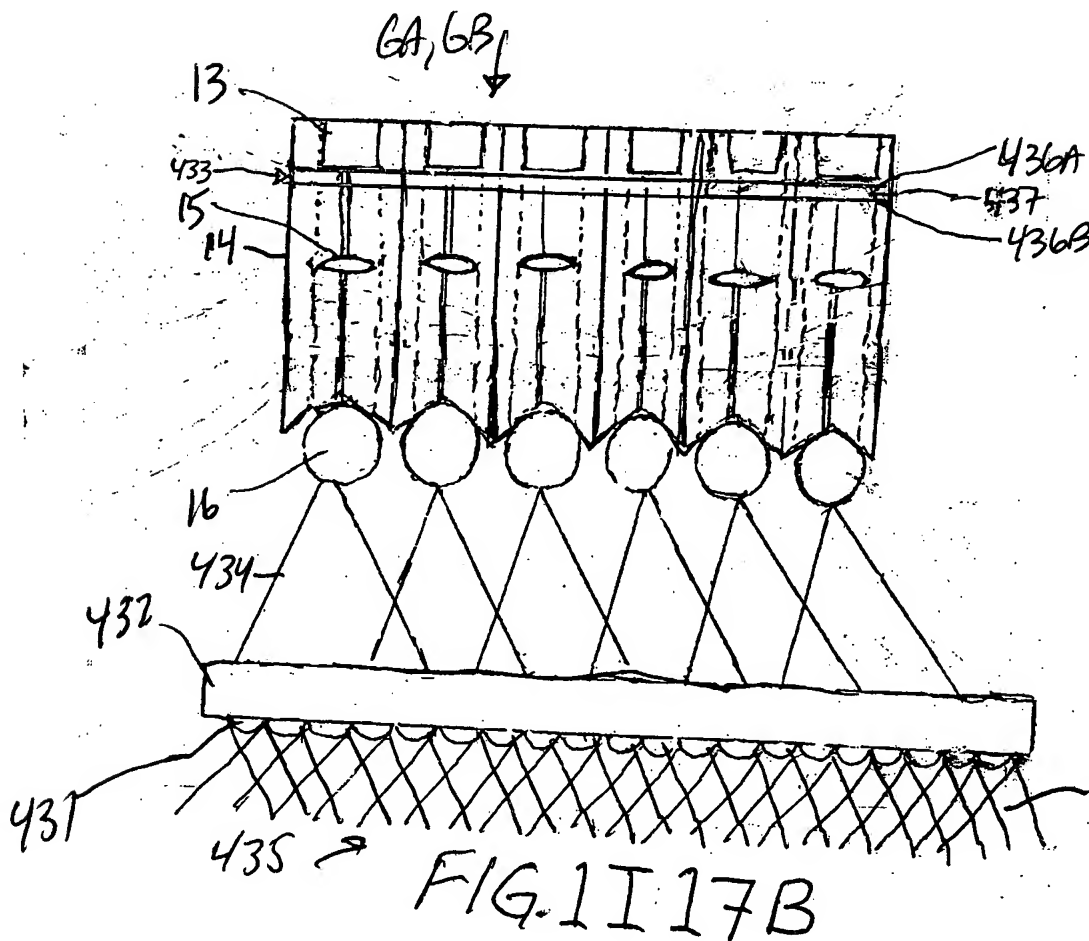


FIG. 1I17B

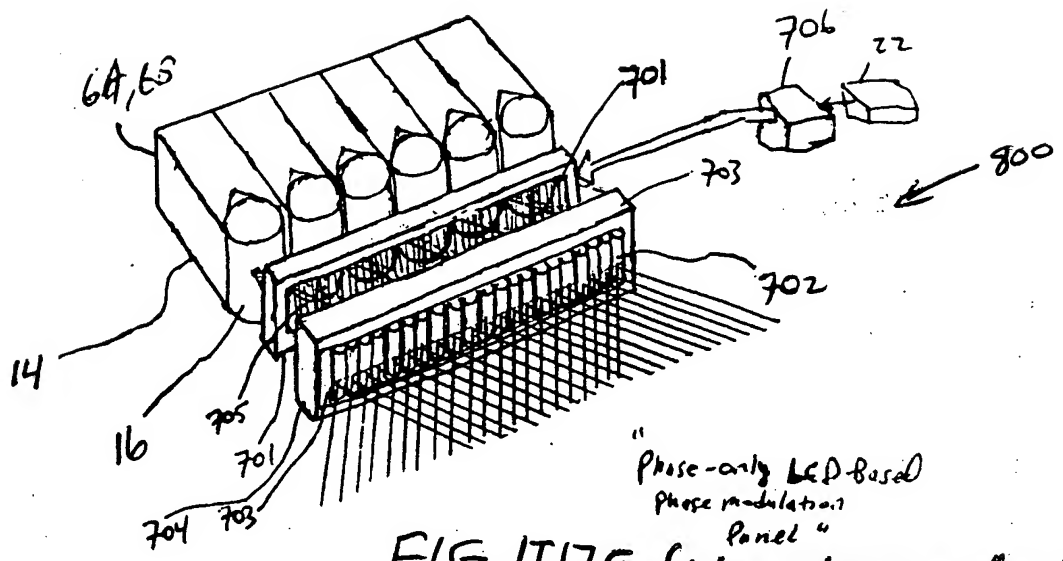


FIG. II17C ($\Delta\phi >$ coherence length)
of VLD

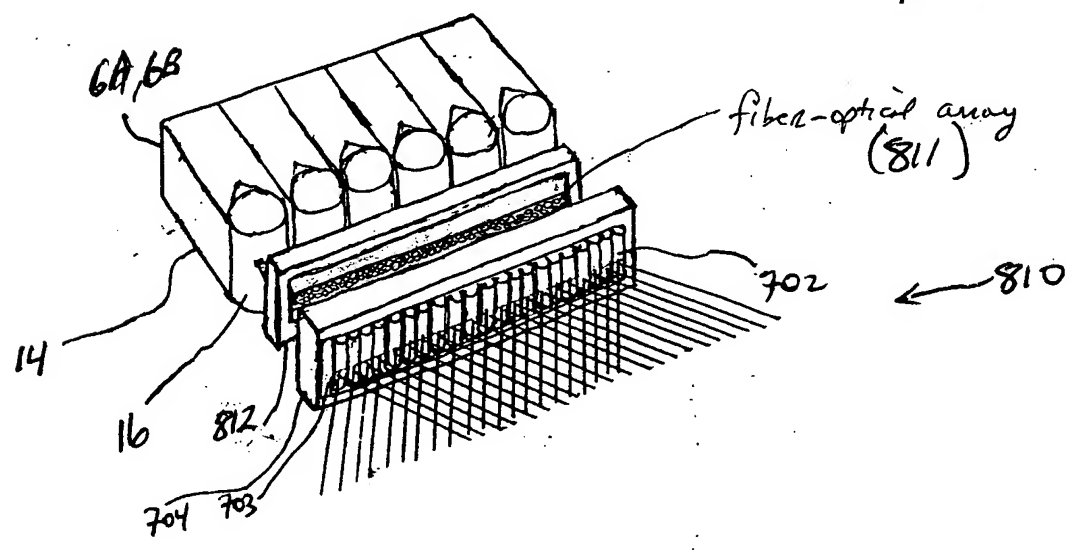


FIG. II17D

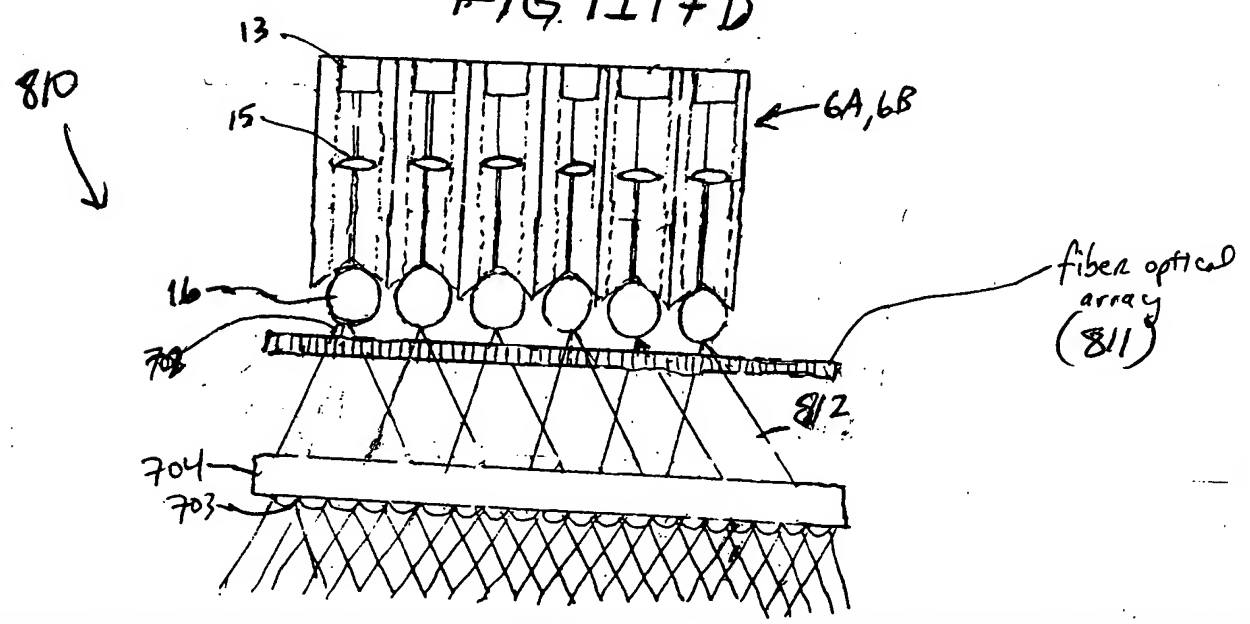


FIG. II17E

Fourth Generalized Method of
Reducing Speckle-Noise Patterns
at Image Detection Array
of the FFD Subsystem (3)

(TFMP)

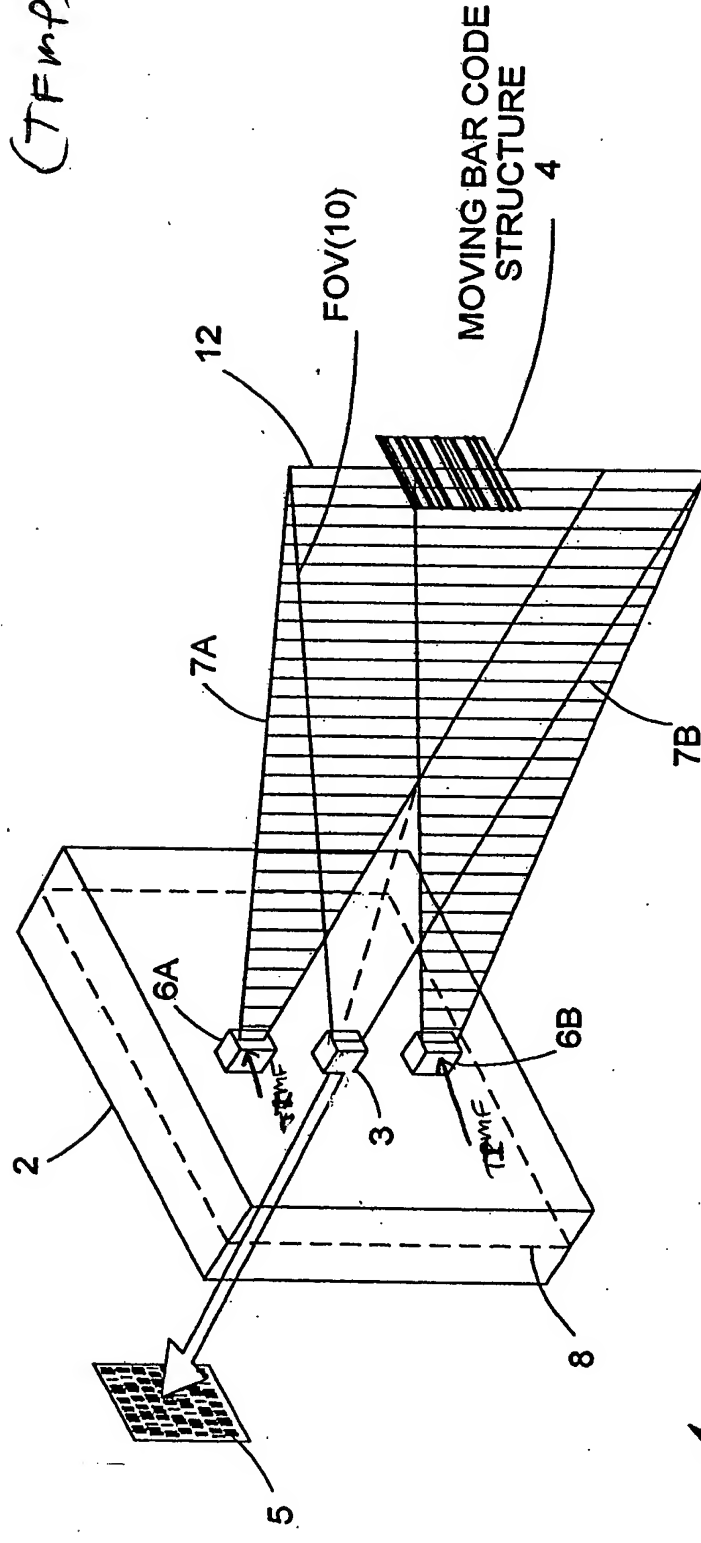


FIG. 1I18A

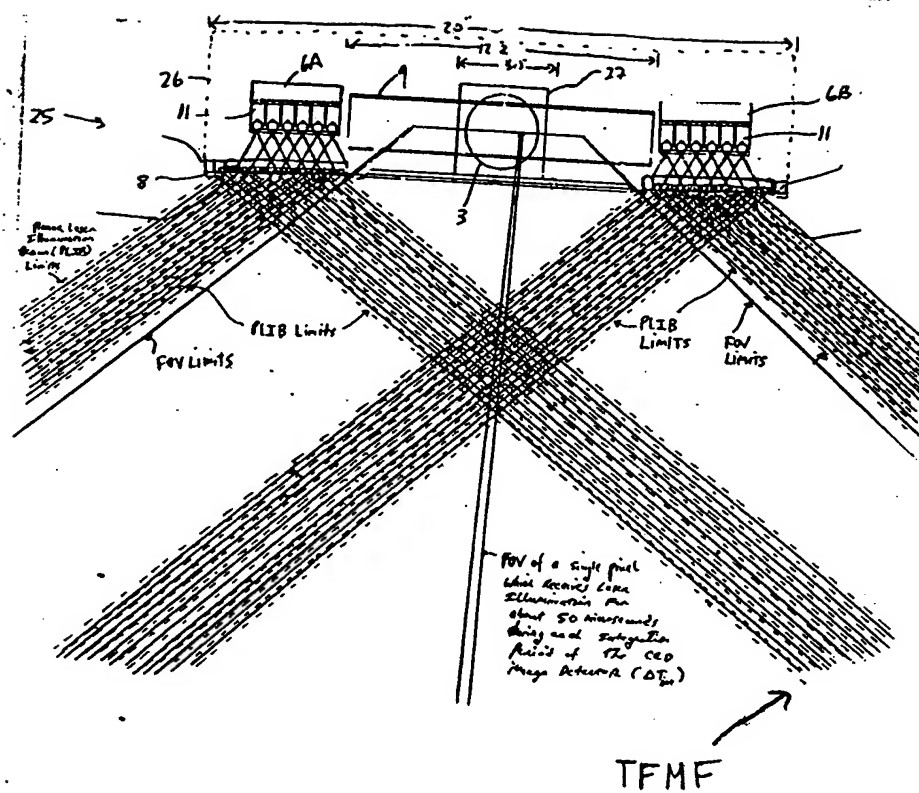


FIG. 1 I 18A

Fourth Generalized Speckle-Noise Pattern Reduction Method
Of The Present Invention

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal frequency of the transmitted PLIB according to a temporal intensity modulation function (T IMF) so as to

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

FIG. 1I18B

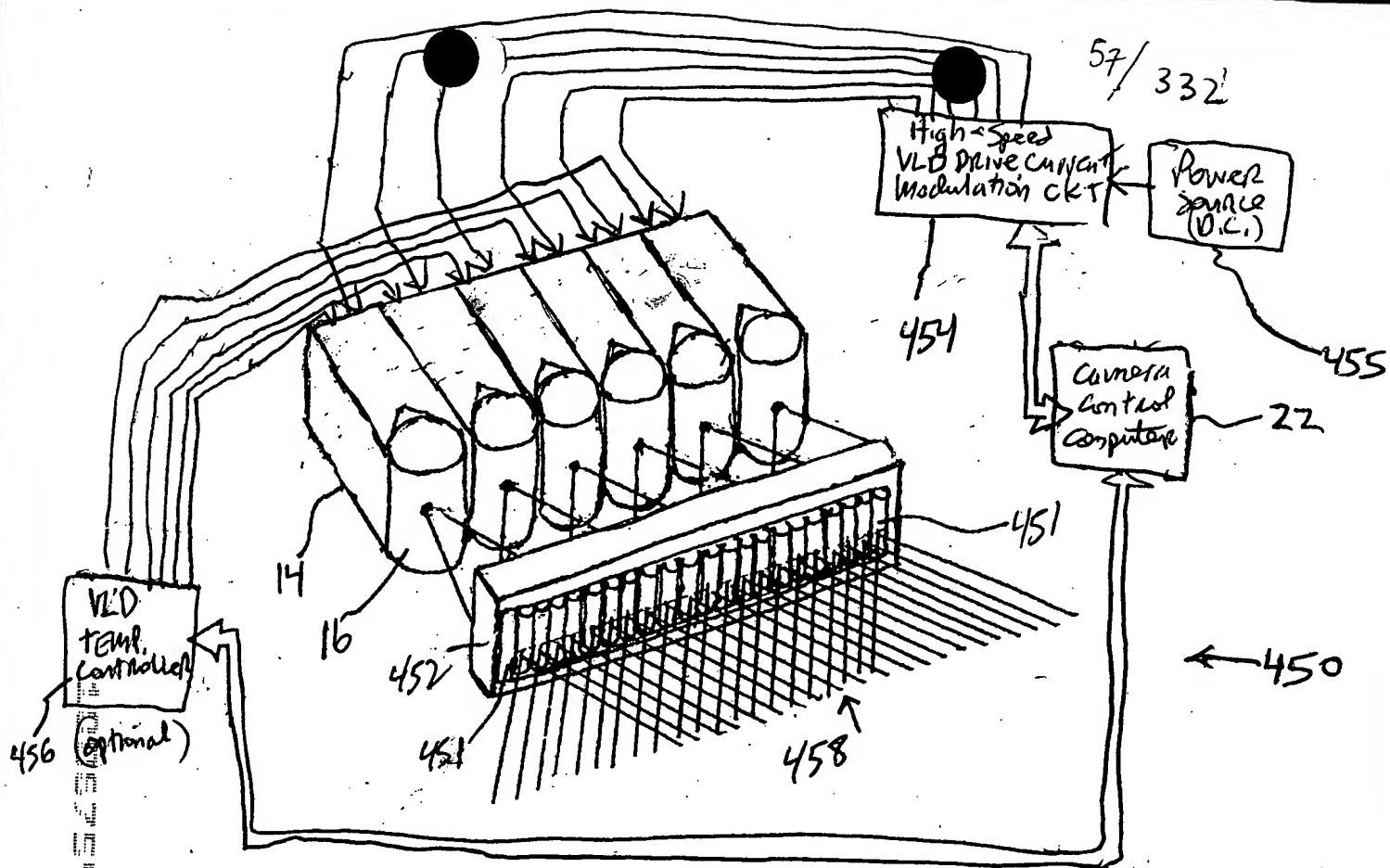


FIG. 1I 19A

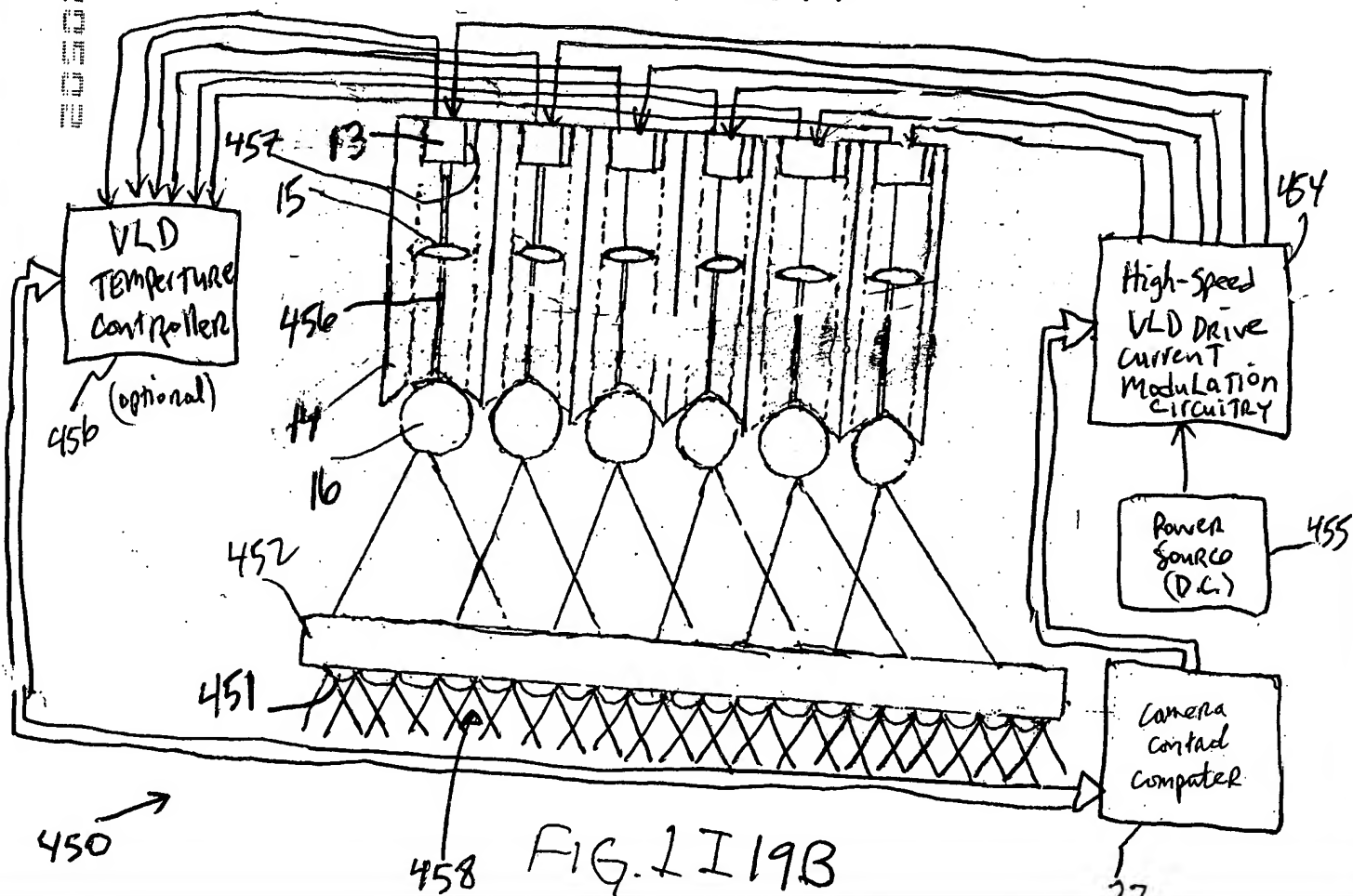


FIG. 1I 19B

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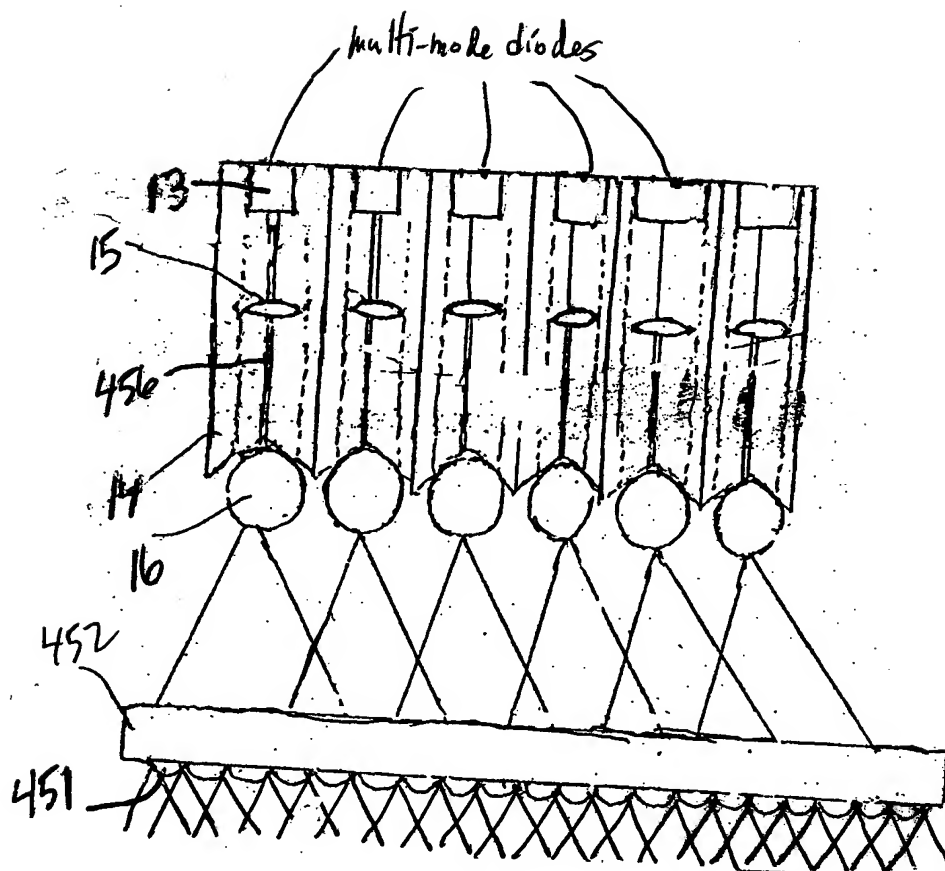


FIG 1I19C

Fifth Generalized Method
of Reducing Speckle-Noise
Patterns AT Image
Detection array of the
FFD subsystem (3)

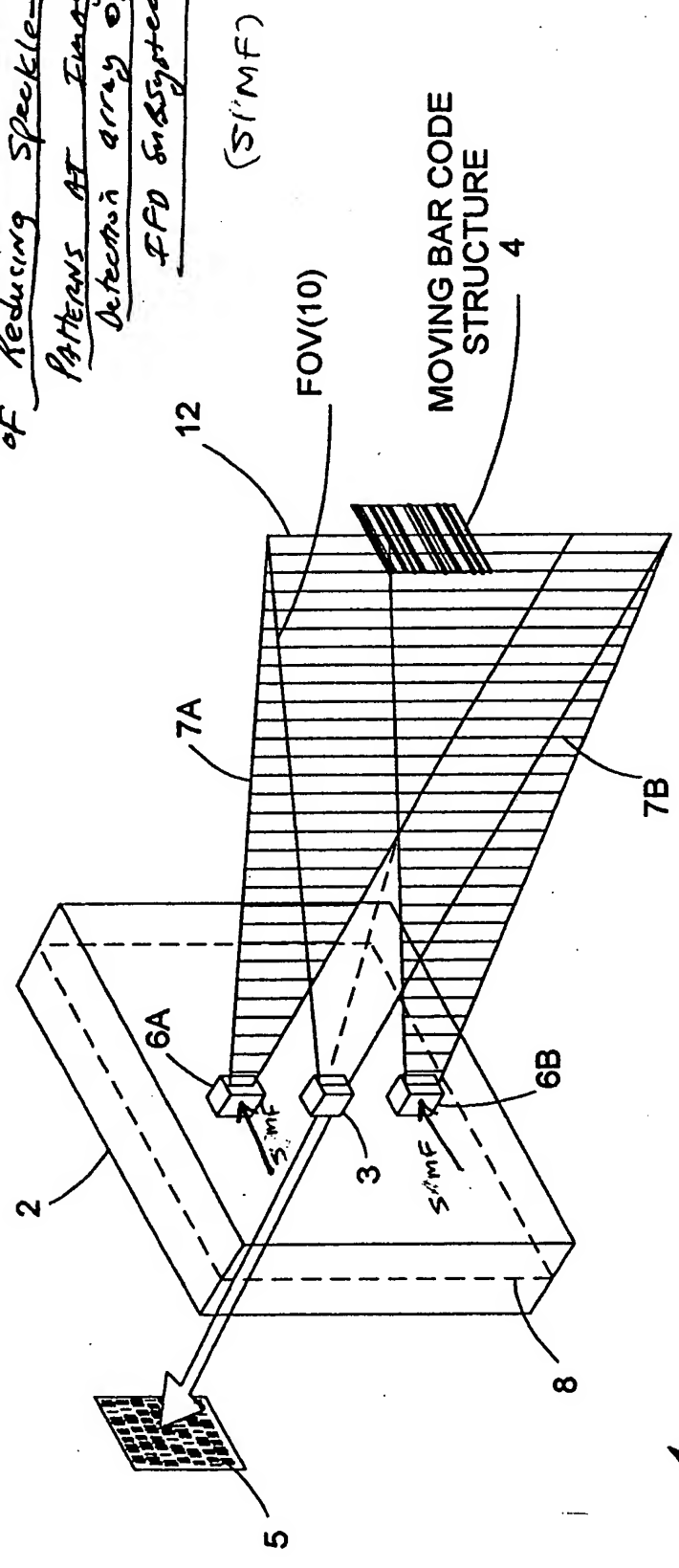


FIG 1F 20

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Fifth Generalized Speckle-Noise Pattern Reduction Method
Of The Present Invention

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial intensity of the transmitted PLIB along the planar extent thereof according to a spatial intensity modulation function (SIMF) so as to :

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

A

↓

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

B

FIG. 1I20B

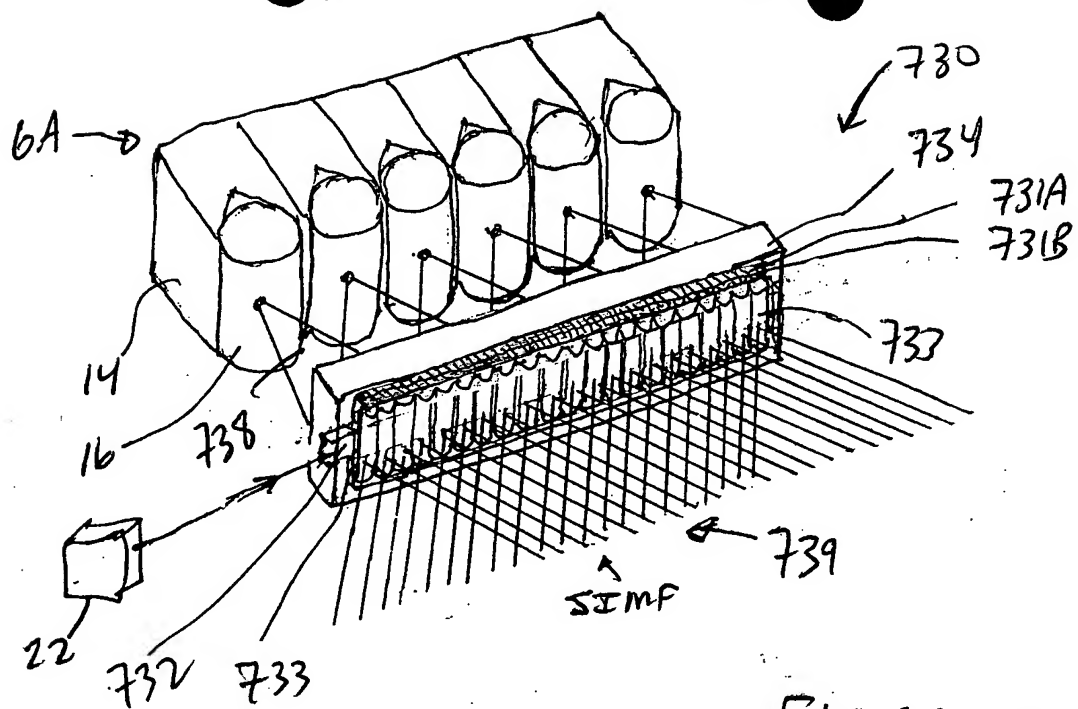


FIG. 1I2IA

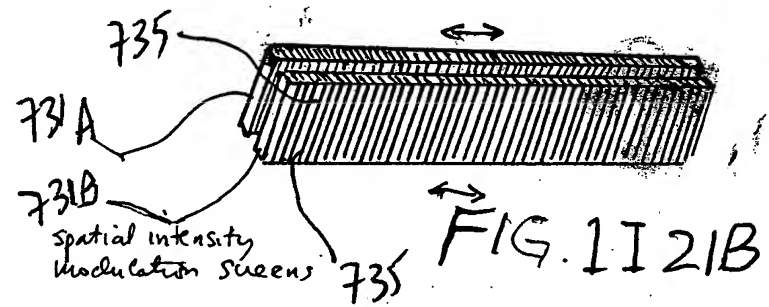


FIG. 1I2IB

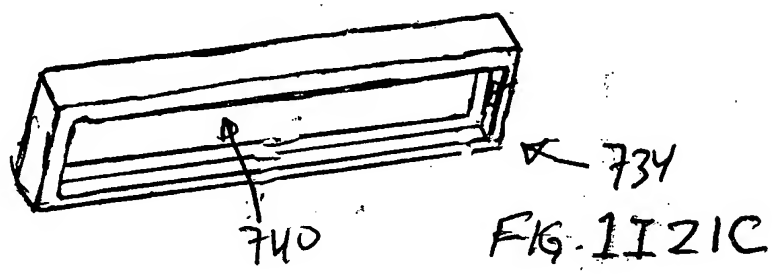


FIG. 1I2IC

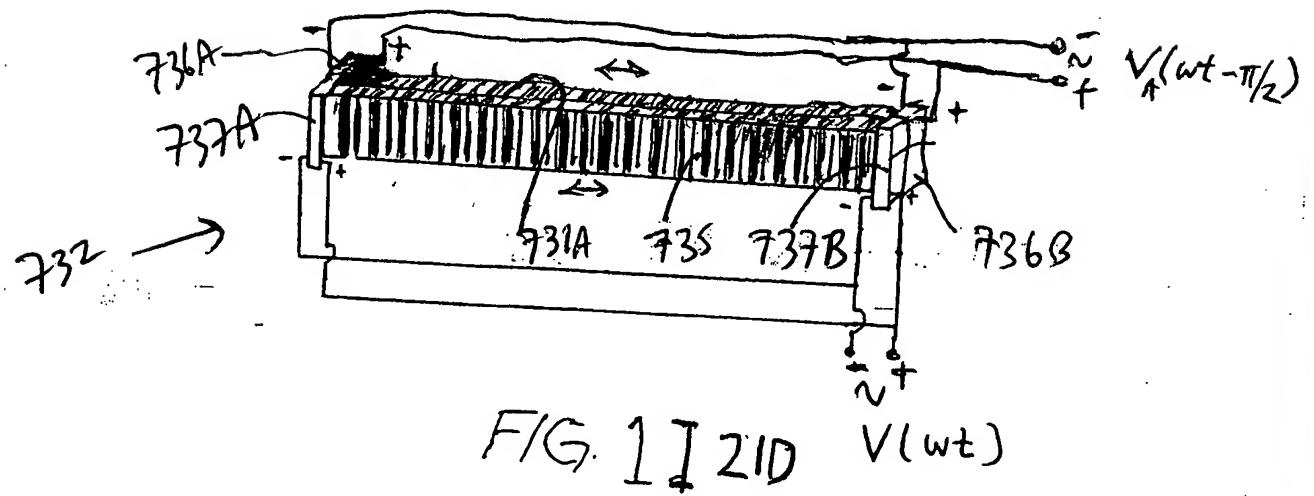


FIG. 1I2ID

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Generalized Method of
Reducing Speckle-Noise Patterns
at Image Detection array
of the IFD Subsystem

(SIMF)

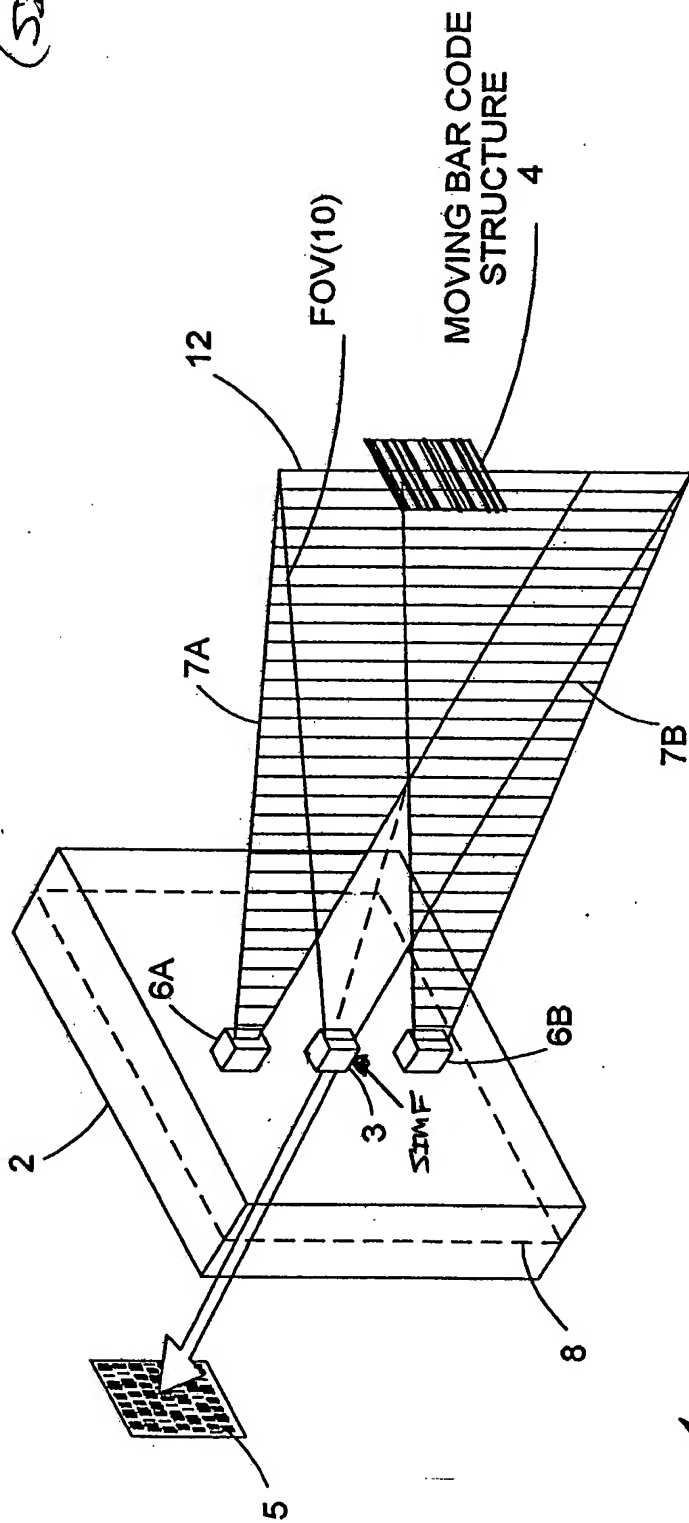


FIG. 1I 22

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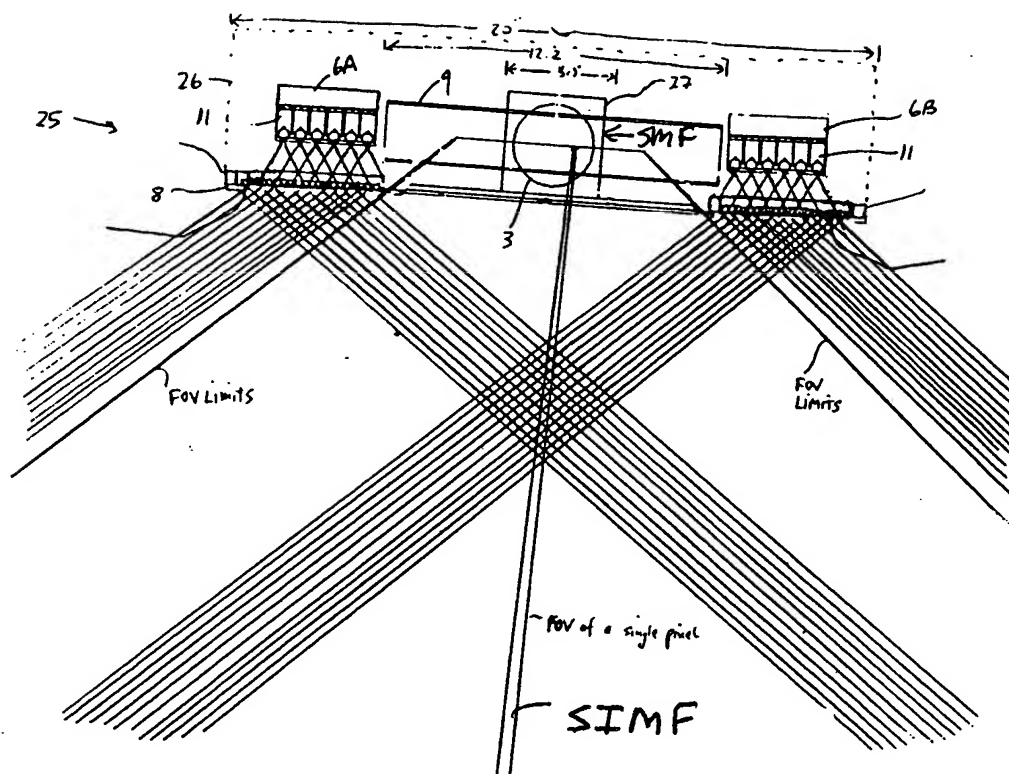


FIG. 1122A

Sixth Generalized Speckle-Noise Pattern Reduction Method
Of The Present Invention

After illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial intensity of the reflected/scattered (i.e. received) PLIB along the planar extent thereof according to a spatial intensity modulation function (SIMF) so as to :

produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the many substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the speckle-noise pattern observed at the image detection array.

FIG. 1I 22B

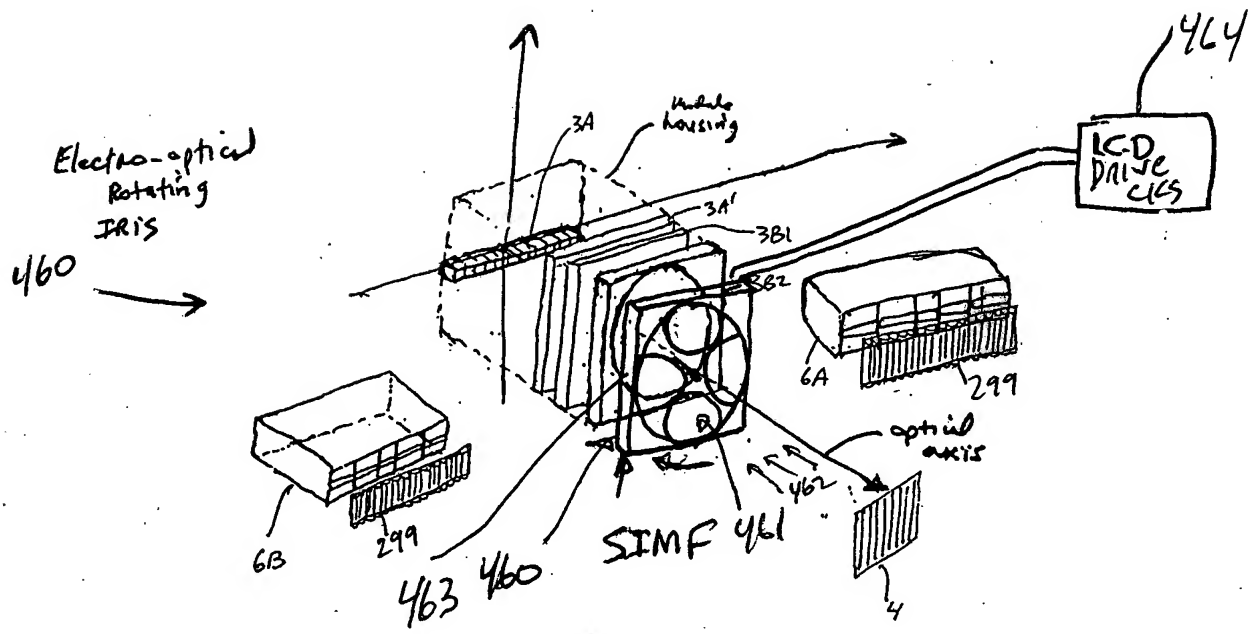


FIG. 1I 23A

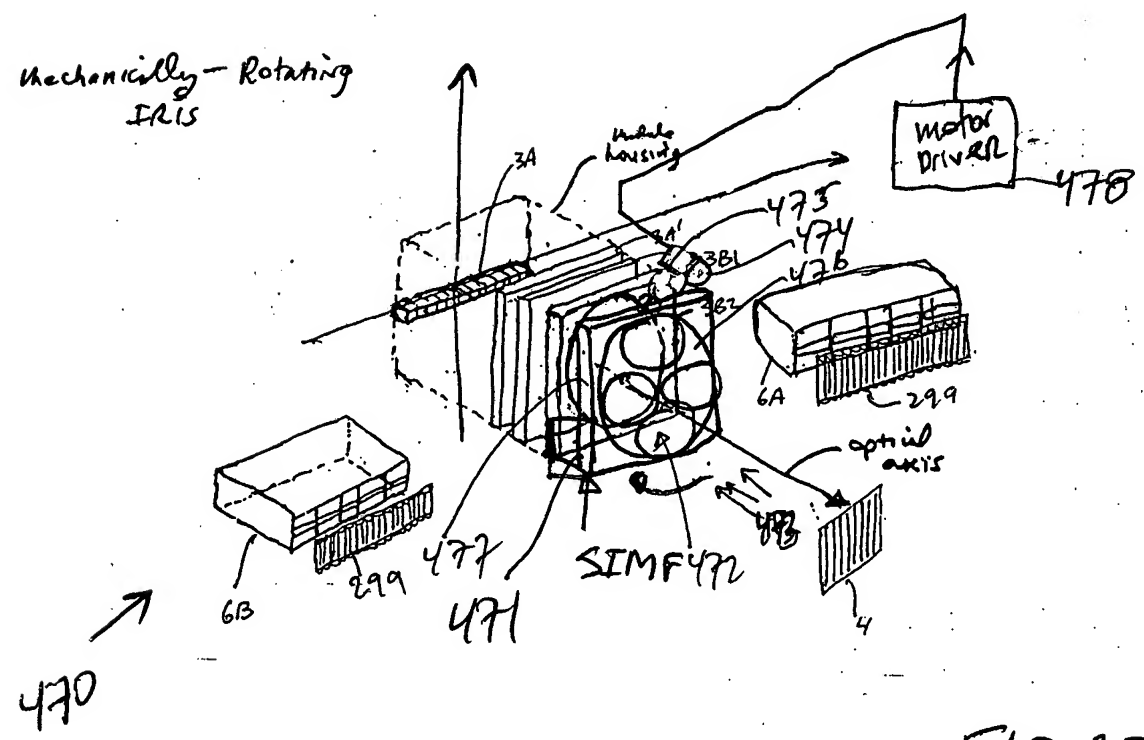
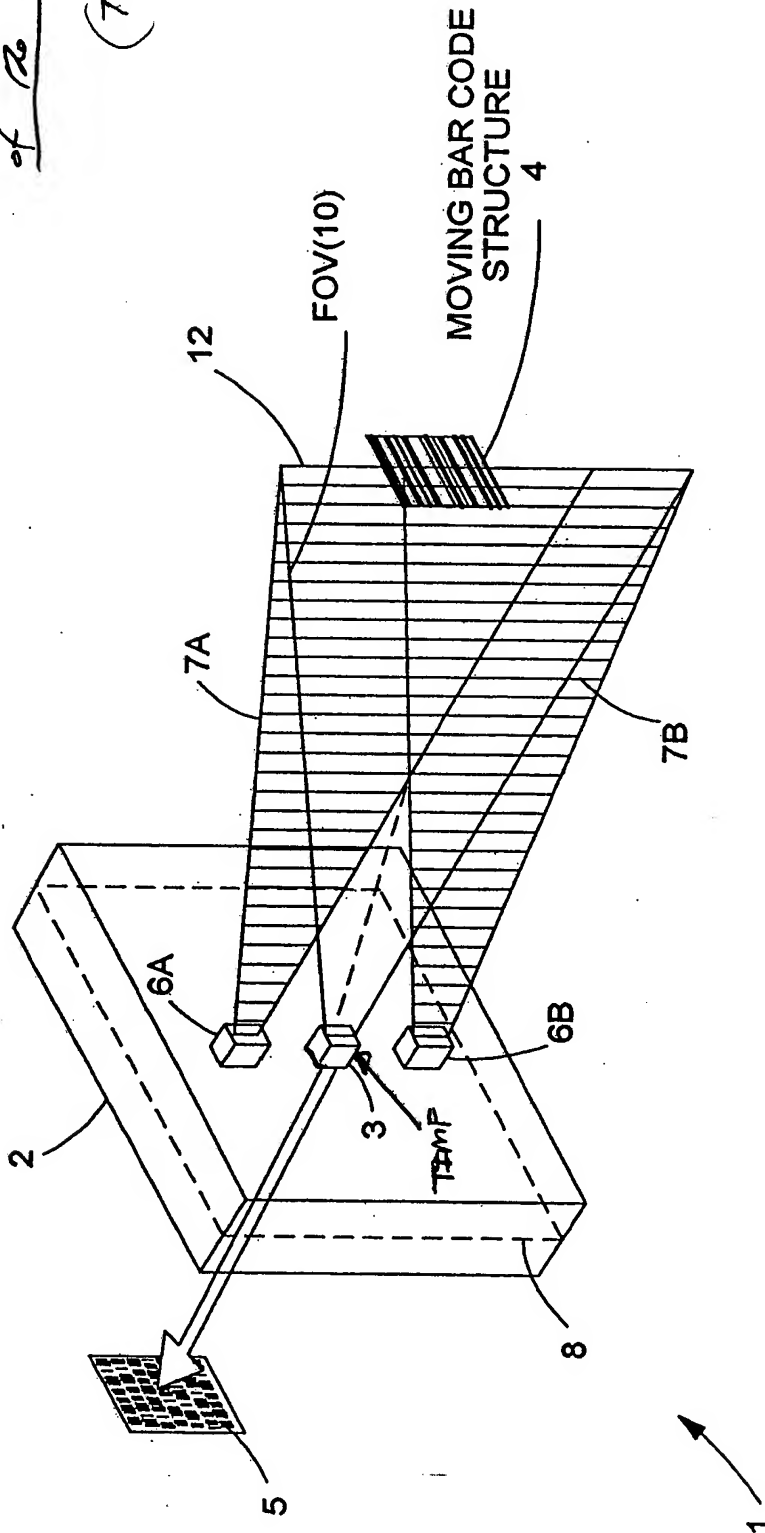


FIG. 1I 23B

Seventh Generalized Method of
Reducing Speckle - Noise Patterns
at Image Detection Array
of IR ITR Subsystem

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(TWIL)



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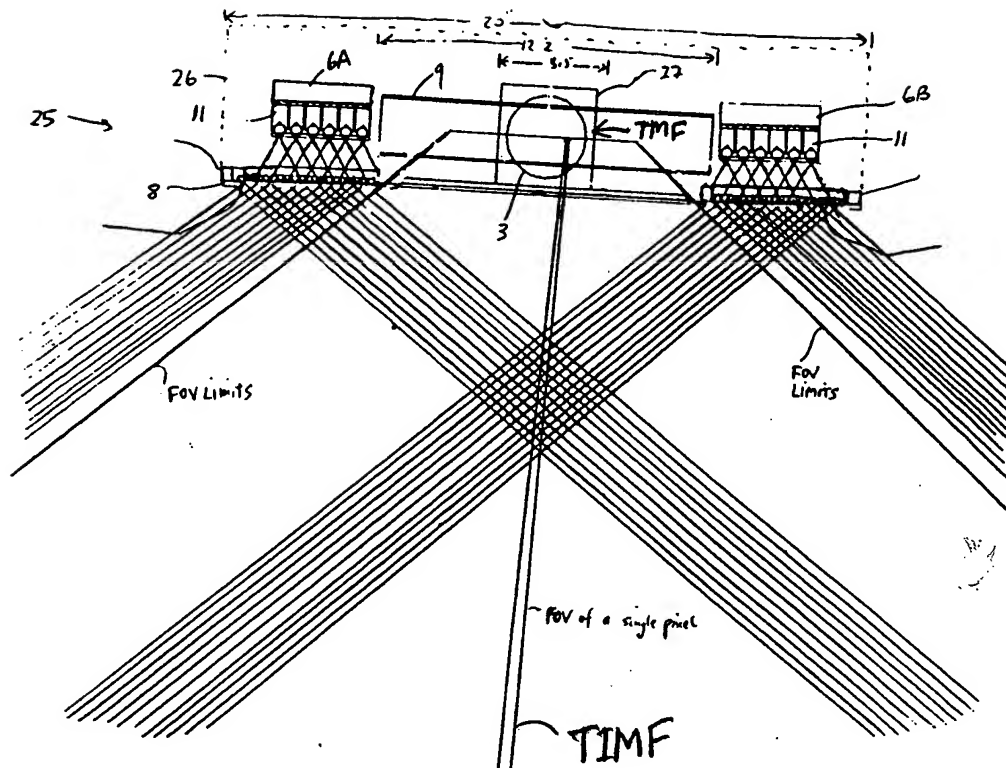


FIG. 1I24A

Seventh Generalized Speckle-Noise Pattern Reduction Method
Of The Present Invention

After illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal intensity of the reflected/scattered (i.e. received) PLIB along the planar extent thereof according to a temporal intensity modulation function (TIMF) so as to

produce many substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the many substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the speckle-noise pattern observed at the image detection array.

FIG. 1I 24B

FIG. 11Z4C

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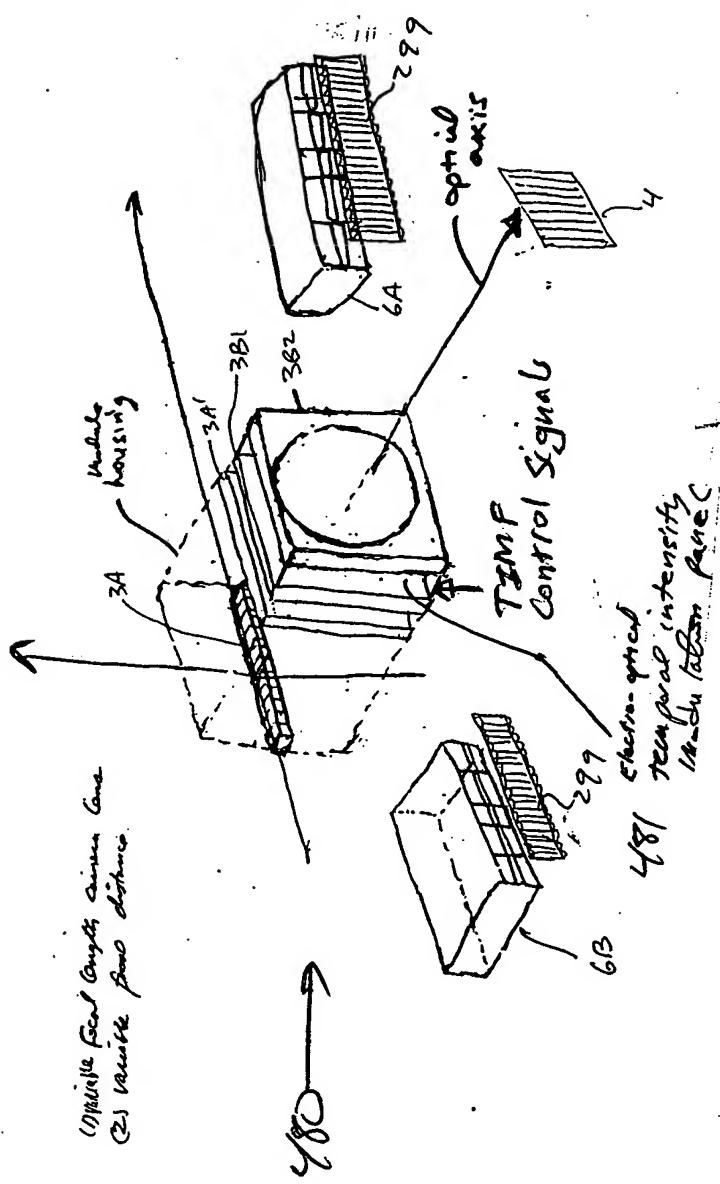
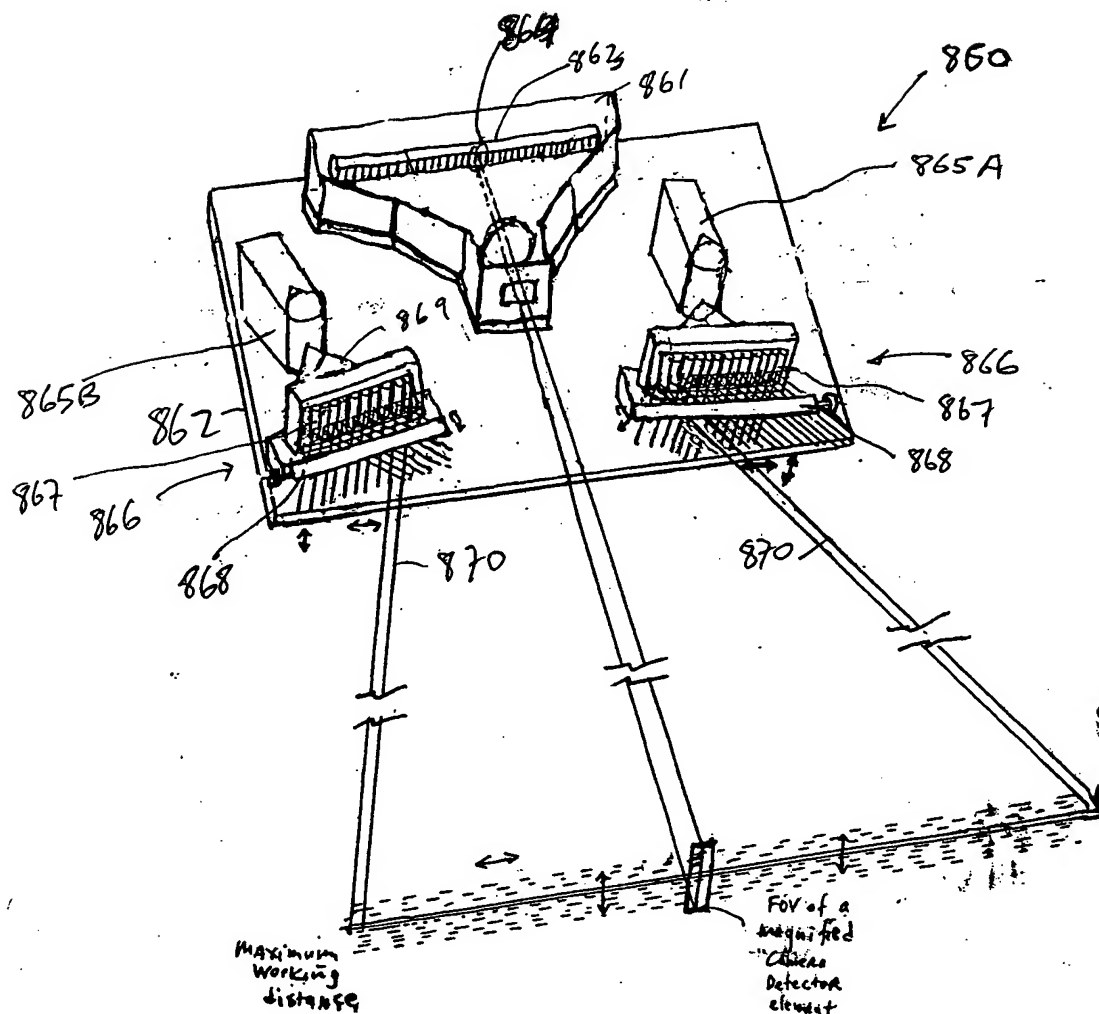


FIG. 11Z4C

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* Lateral and Transverse Microoscillation of PLIB

FIG. 1I25A1

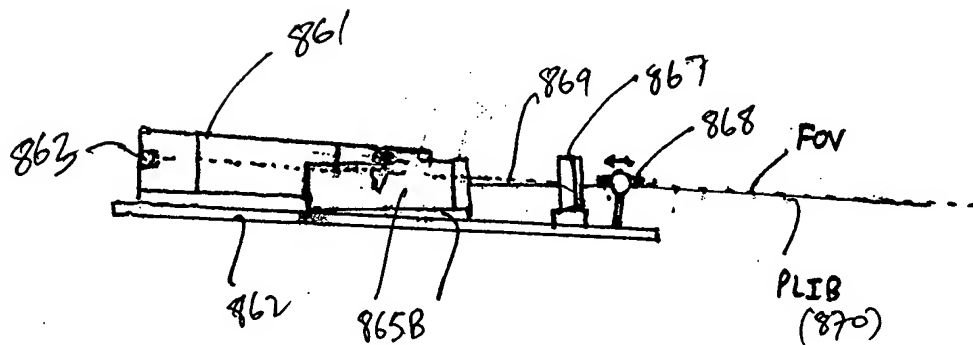


FIG. 1I25A2

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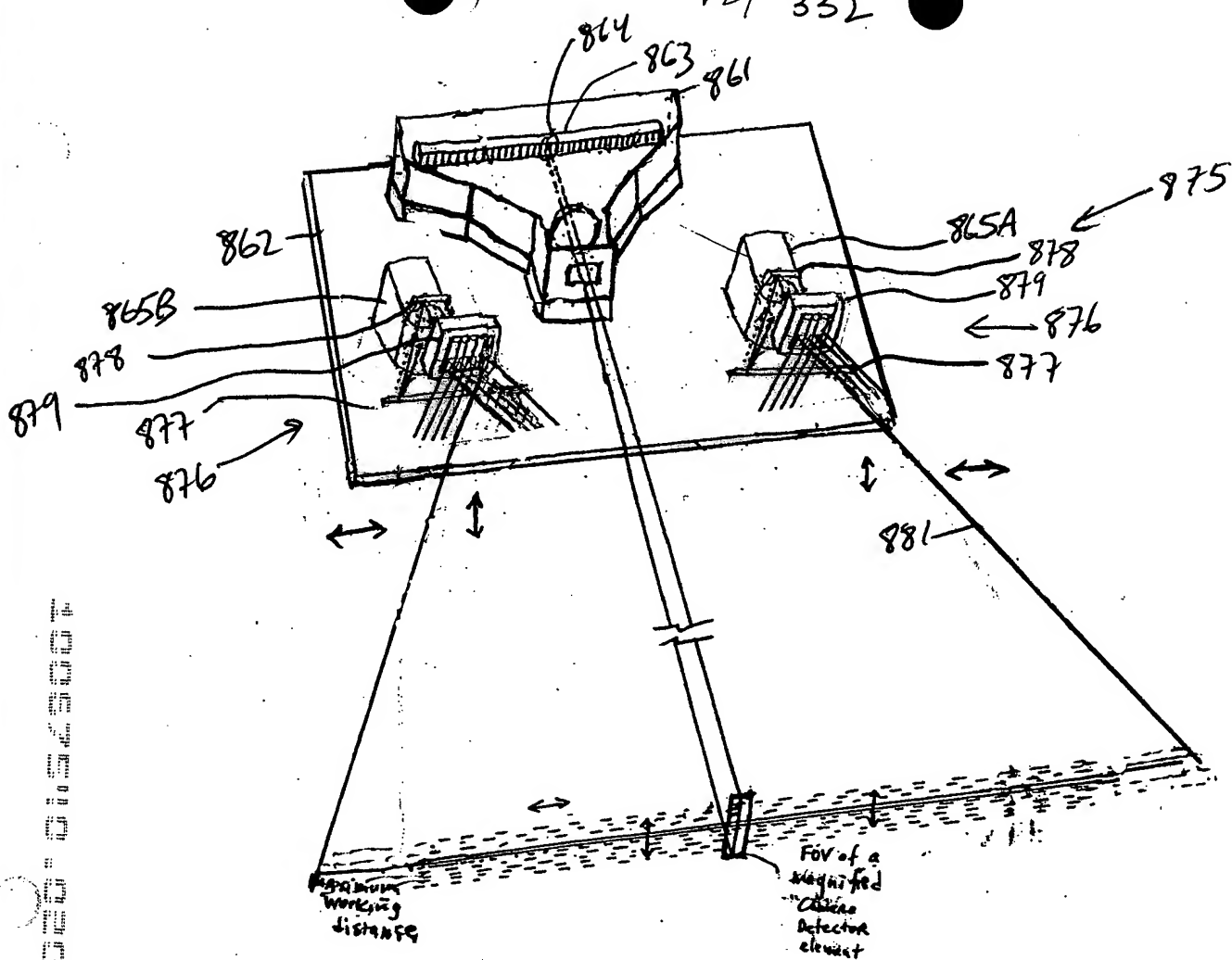


FIG. 1I25B1

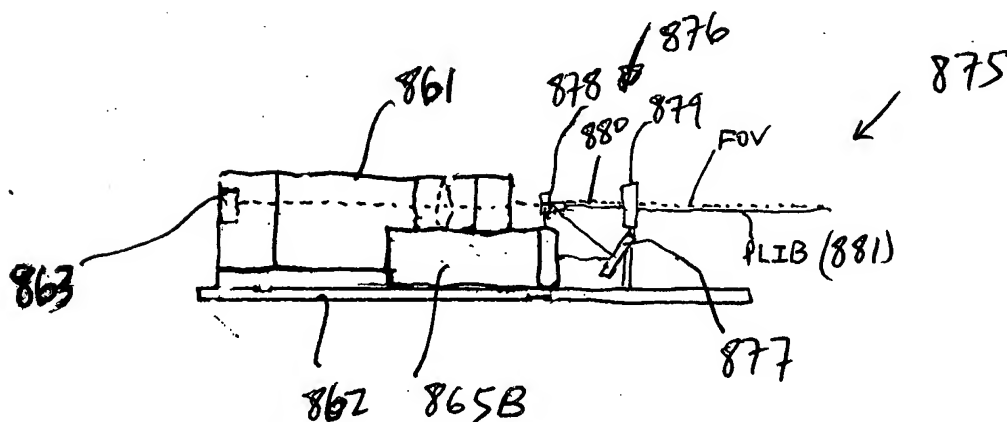
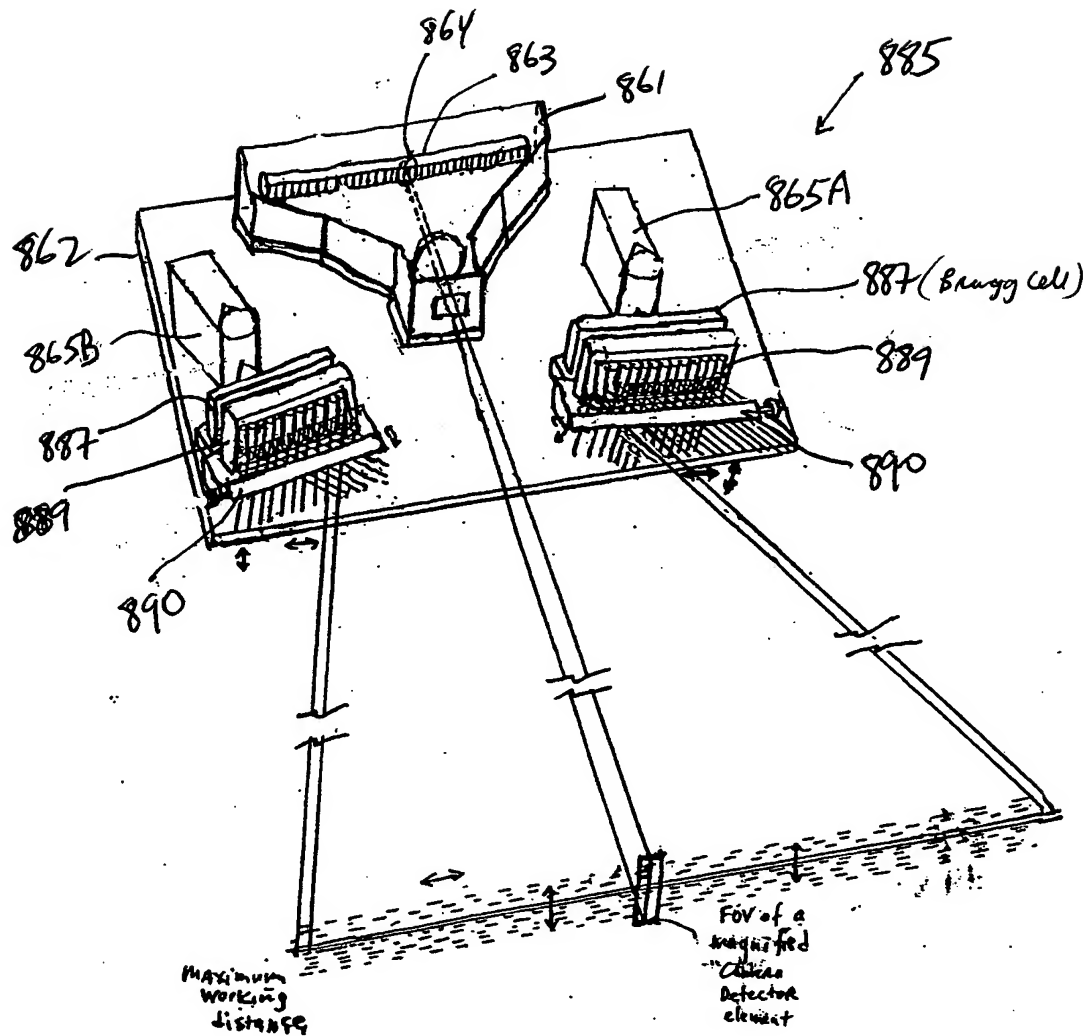


FIG. 1I25B2



* Lateral and Transverse Microoscillation of PLIB

FIG. 1I25C1

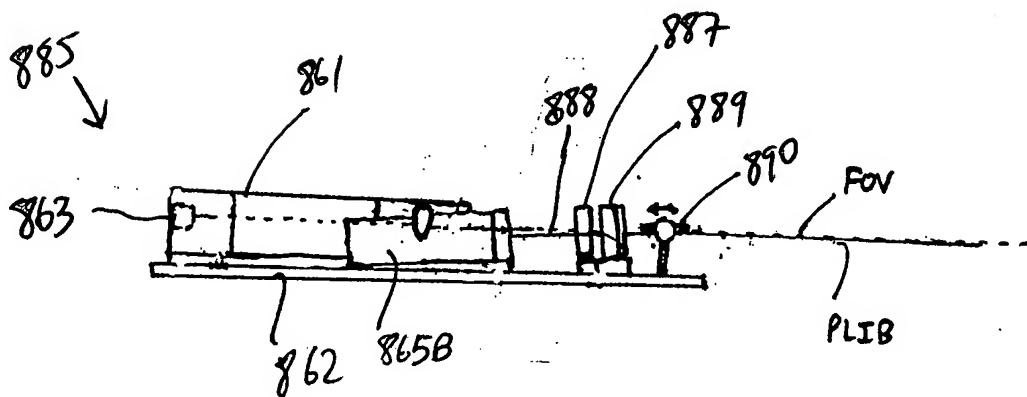


FIG. 1I25C2

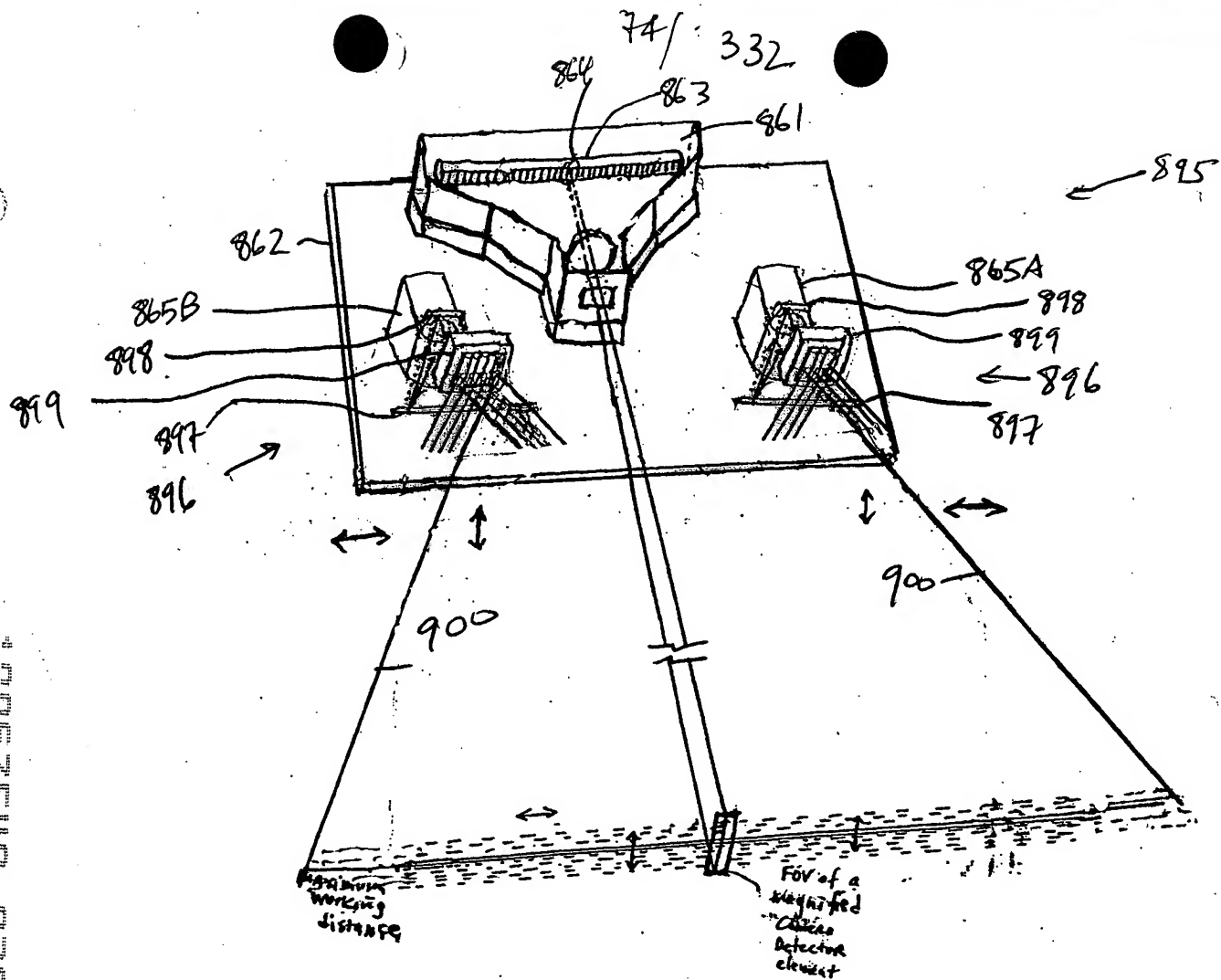


FIG. 1I25D1

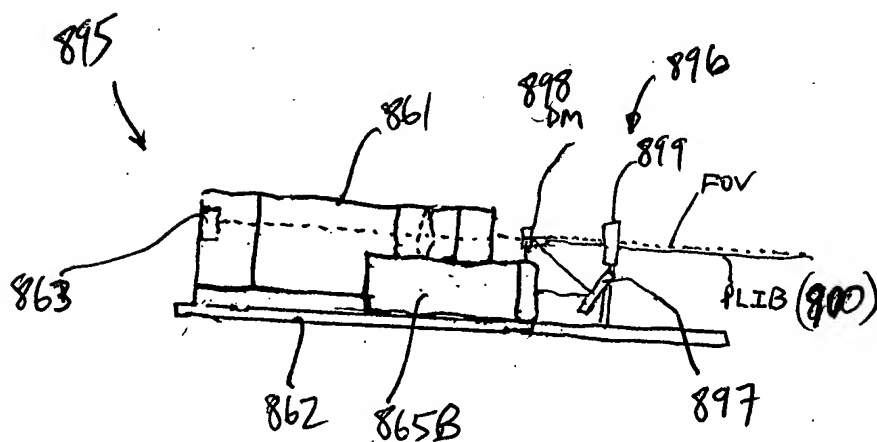
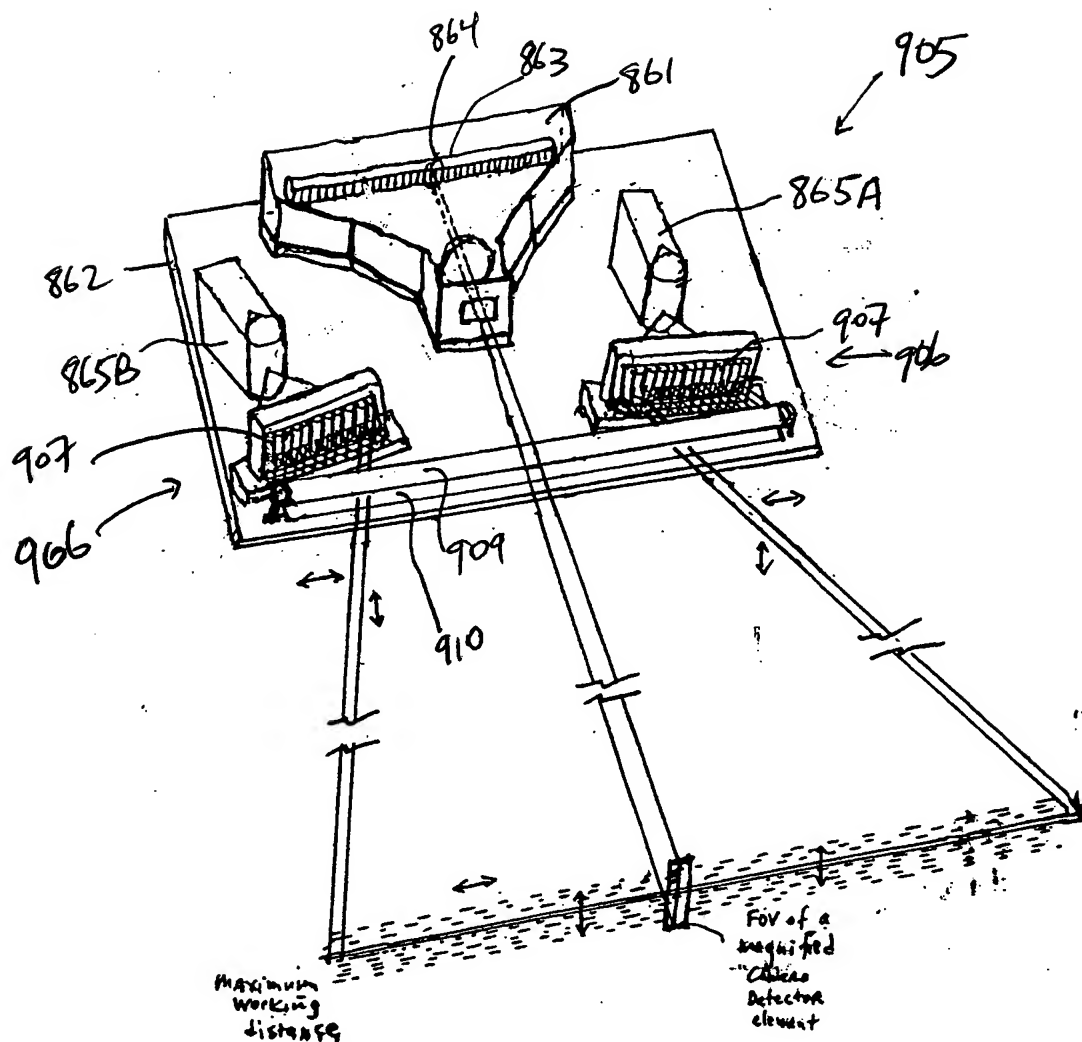


FIG. 1I25D2



* Lateral and Transverse Microoscillation of PLIB

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FIG. 1I25E1

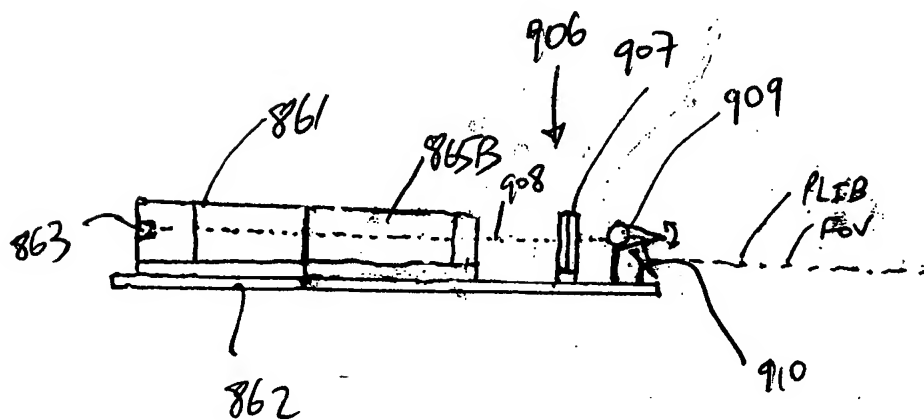
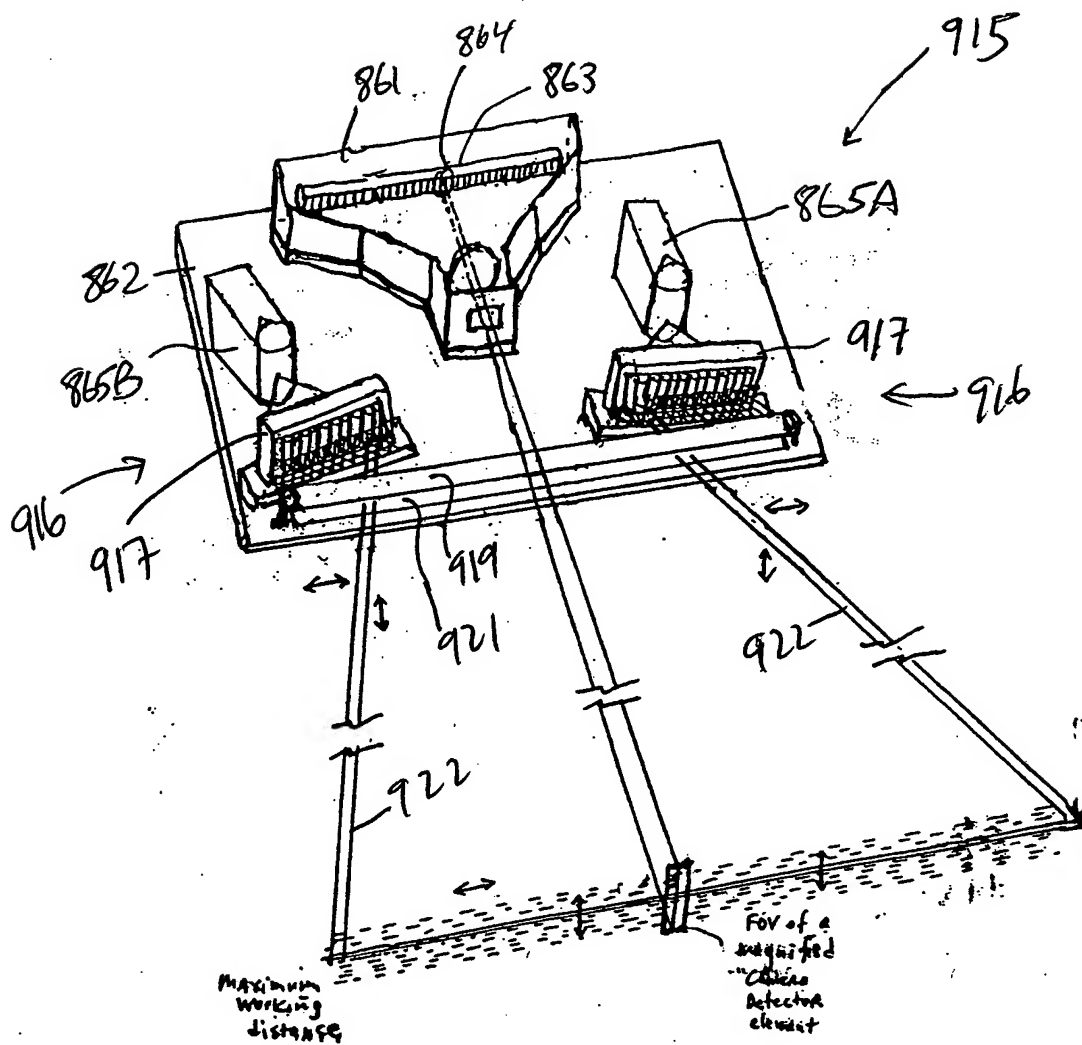


FIG. 1I25E2



* Lateral and Transverse Microoscillation of PLIB

FIG. 1I25F1

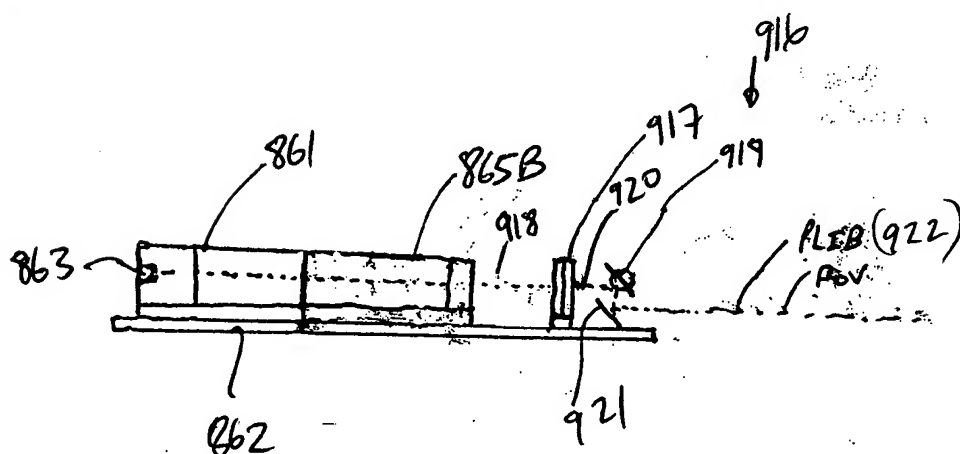
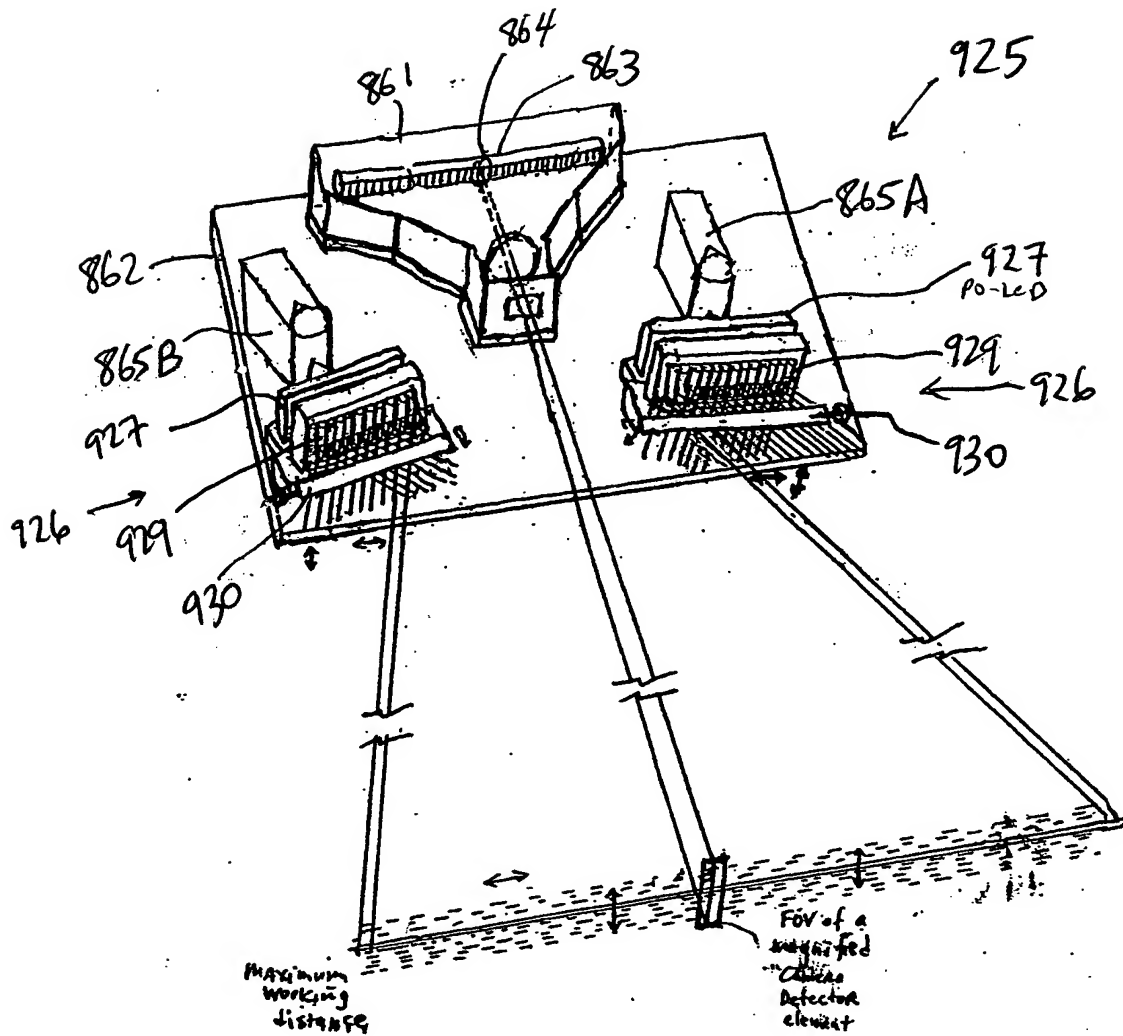
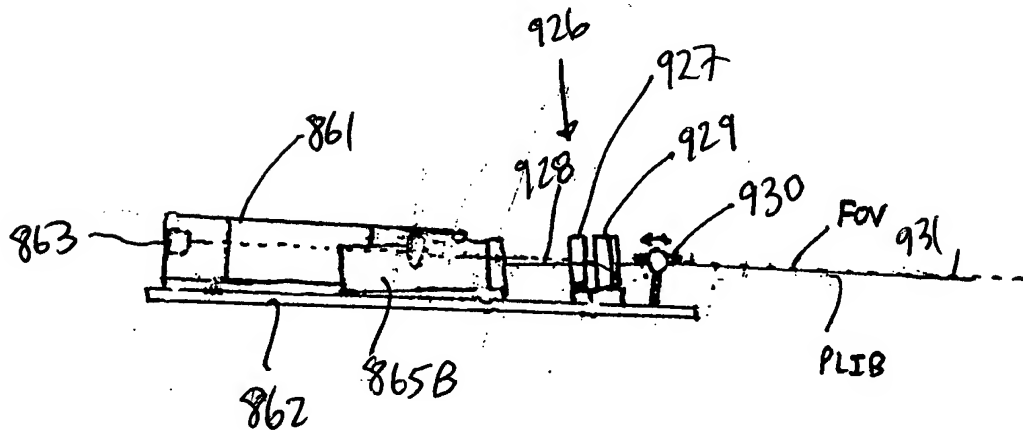


FIG. 1I25F2

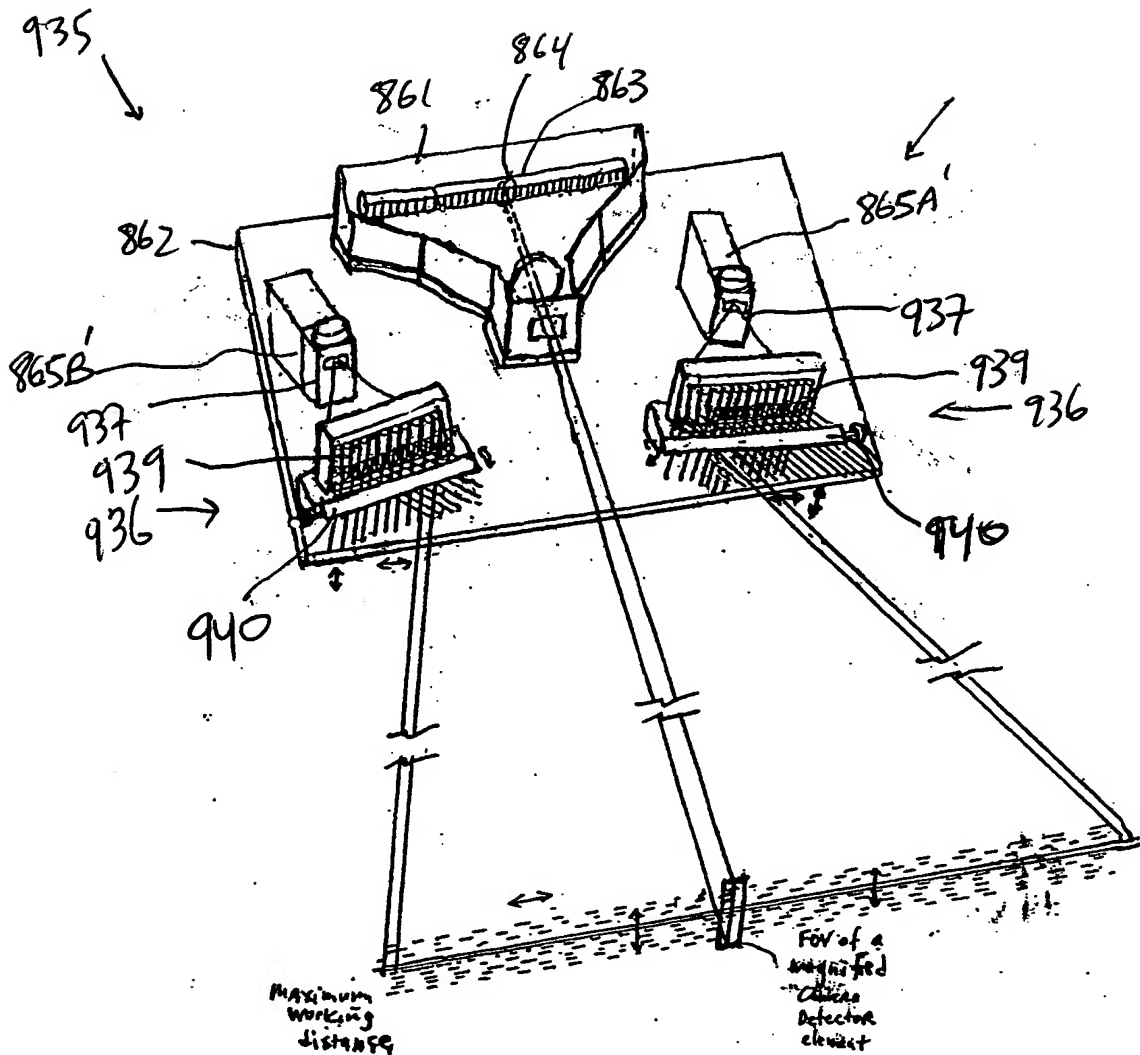


* Lateral and Transverse Microoscillation of PLIB

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* lateral and Transverse Maxioscillation of PLIB

FIG 1I25H1

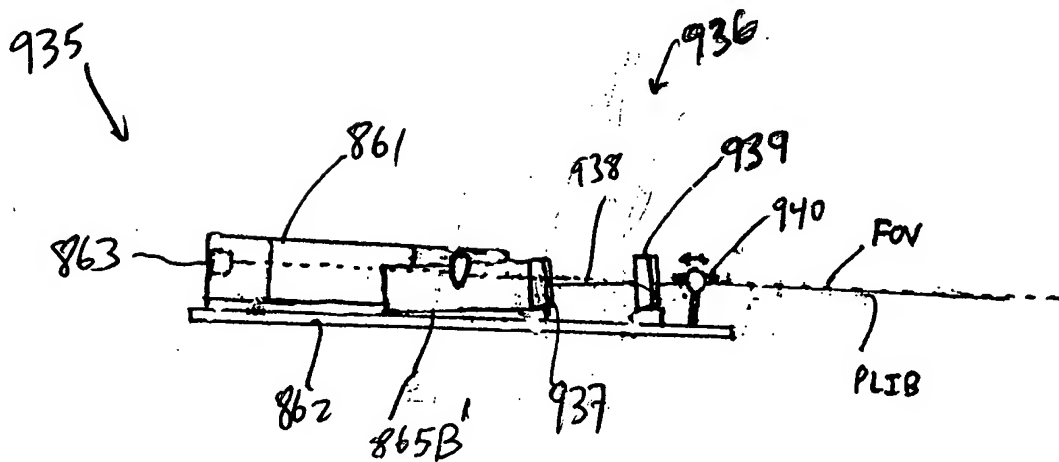
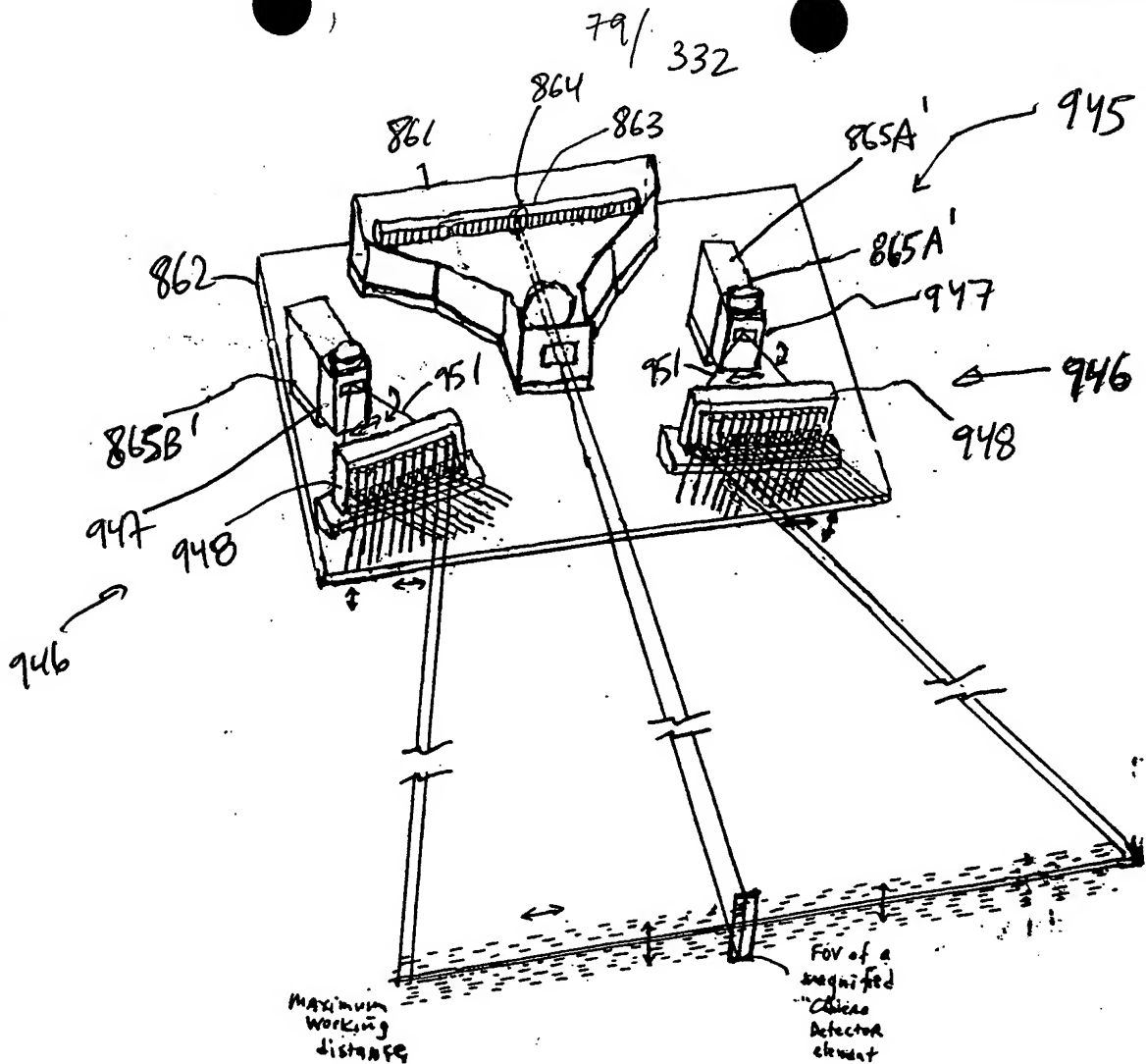


FIG. 1I25H2



Lateral and
Transverse
Misalignment of ALB

FIG. 1I25I1

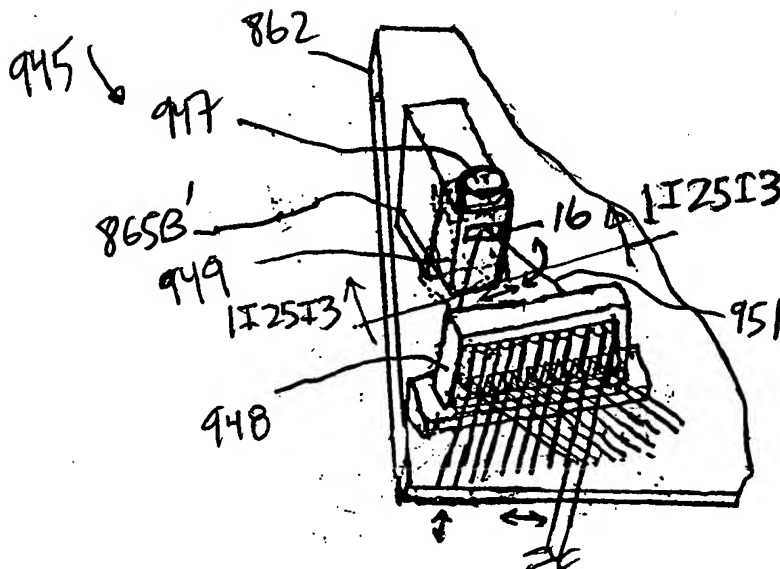


FIG. 1I25I2

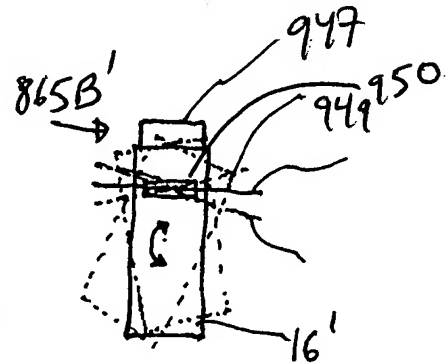


FIG. 1I25I3

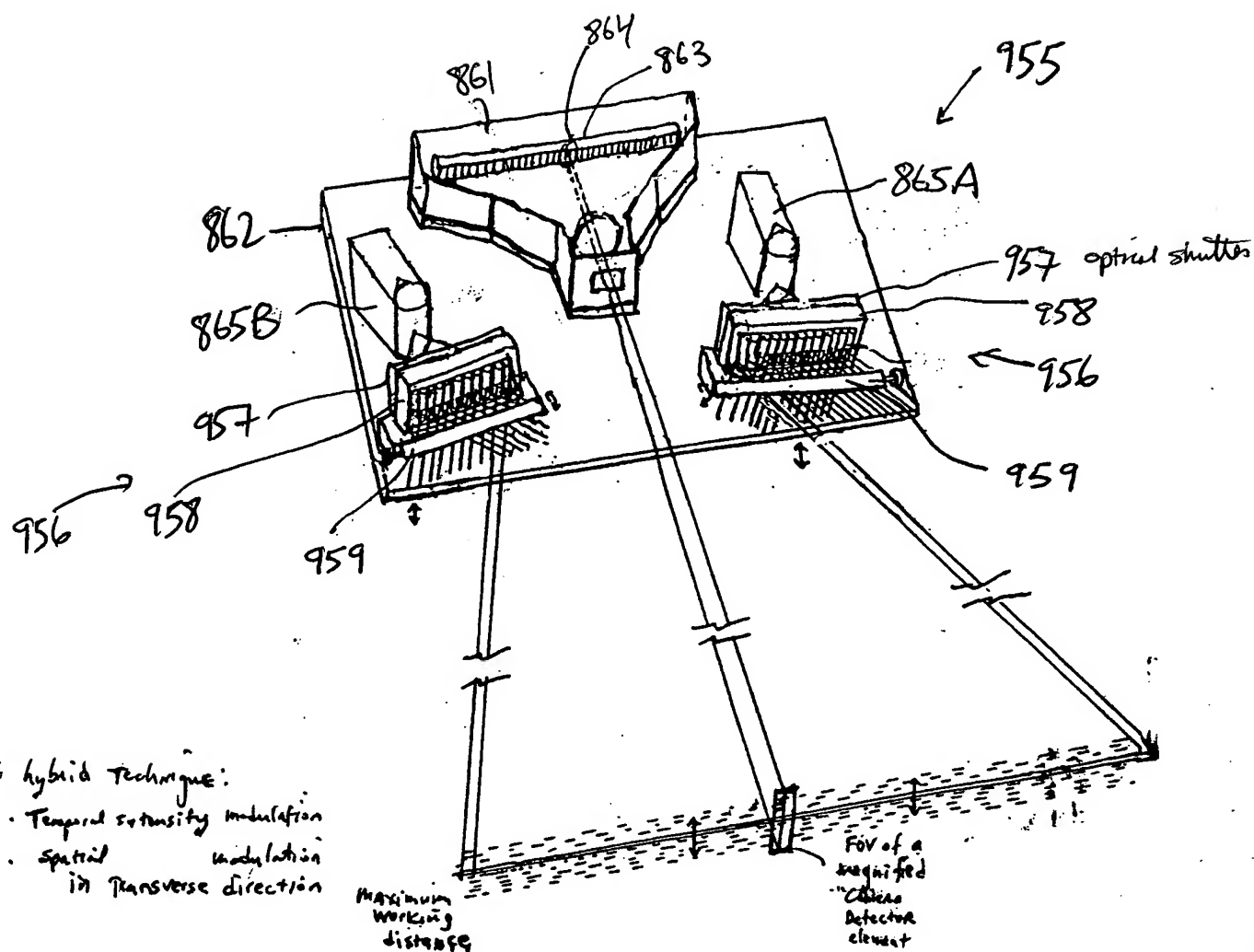
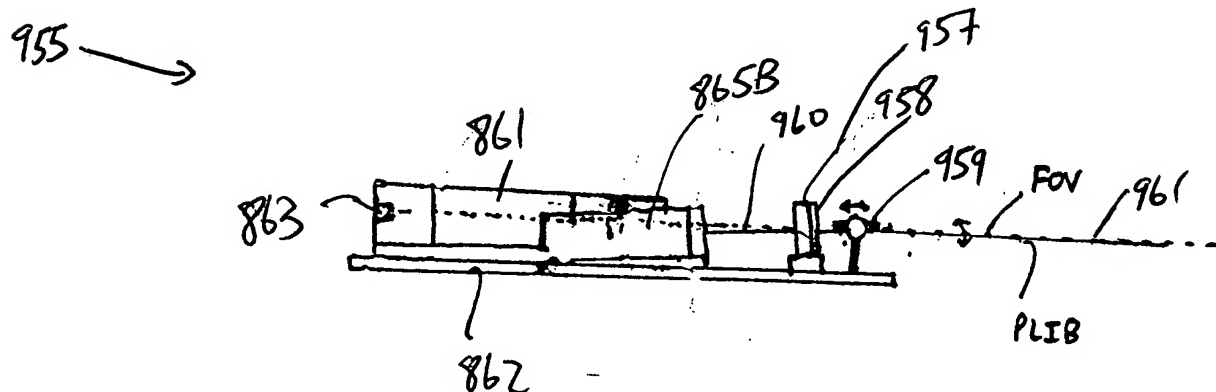
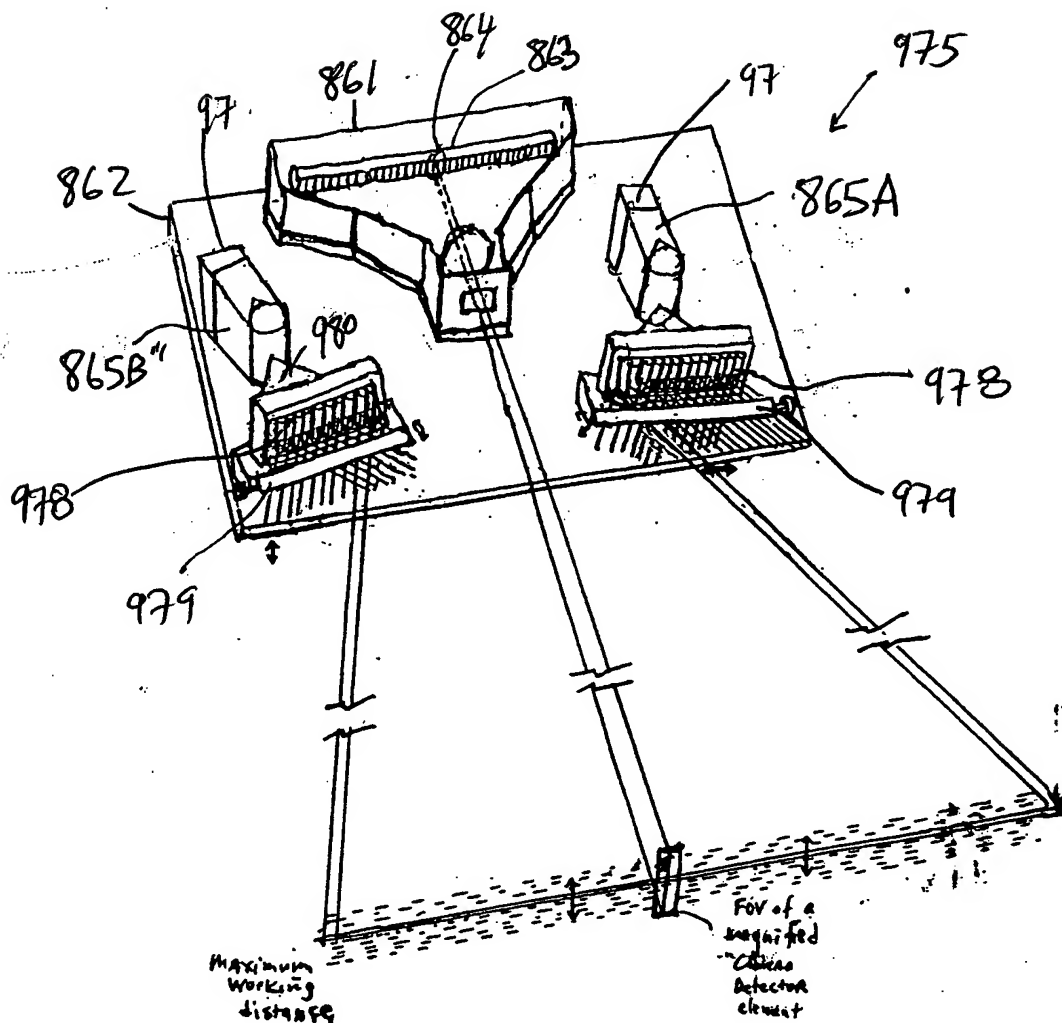


FIG. 1I25J1





- * hybrid =
 - Temp freq. mod.
 - Spatial phase mod.
- *

Transverse
Microscopical of PLIB

FIG. 1I25L1

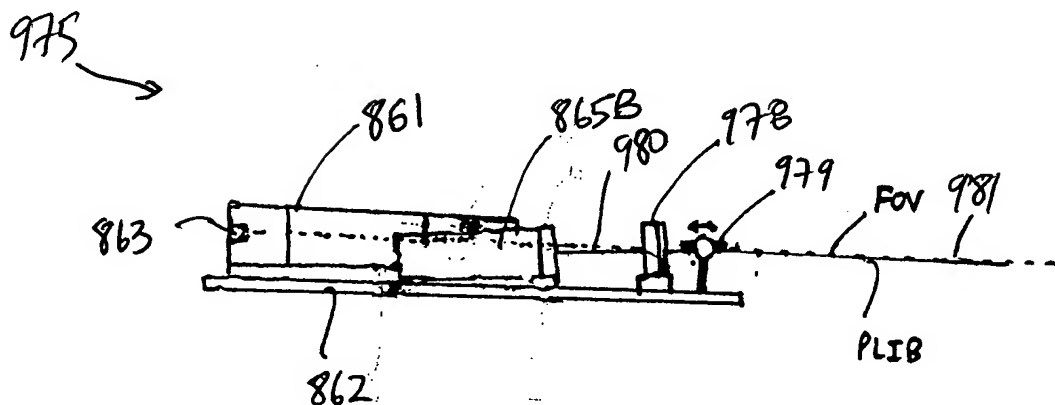
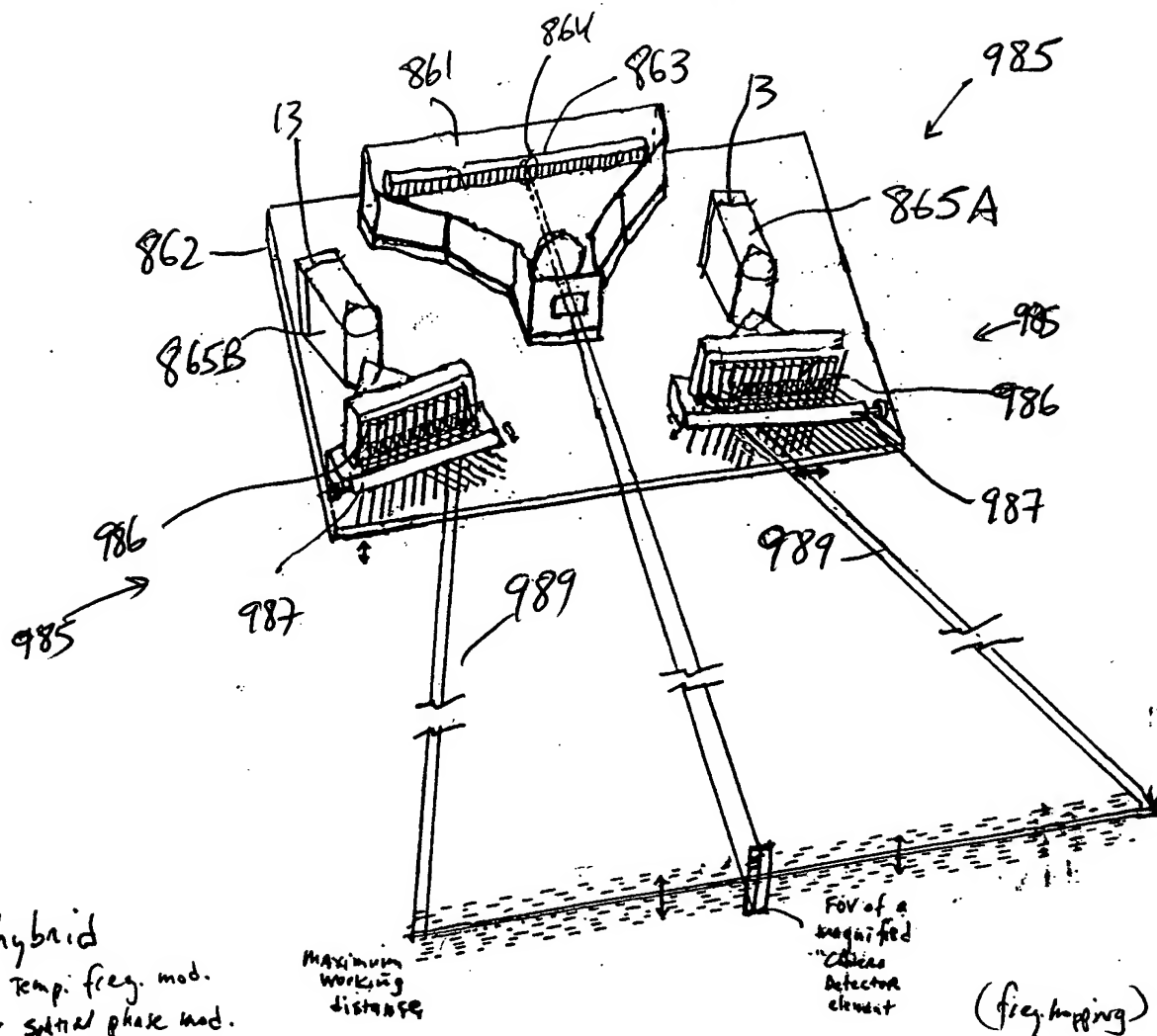


FIG. 1I25L2

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* hybrid
 • temp. freq. mod.
 • spatial phase mod.

* Transverse
 Microscillation of PLIB

FIG. 1I25M1

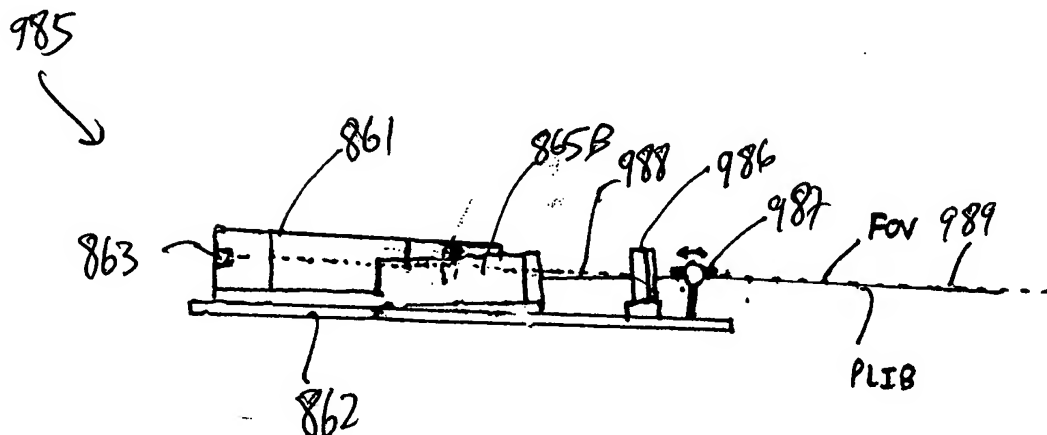


FIG. 1I25M2

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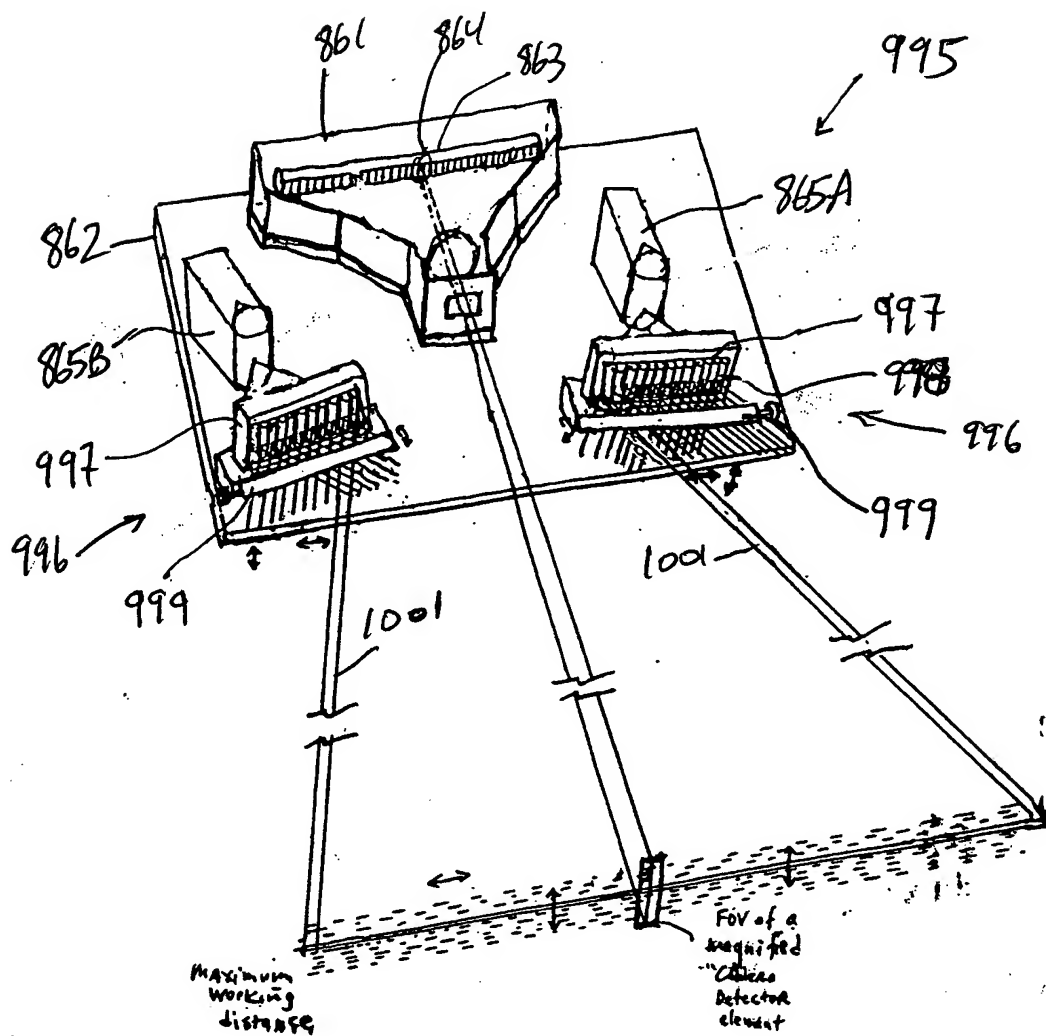


FIG. 1I25N1

- hybrid:
 - spatial intensity mod.
 - spatial phase
- * Lateral and Transverse Microoscillation of PLIB

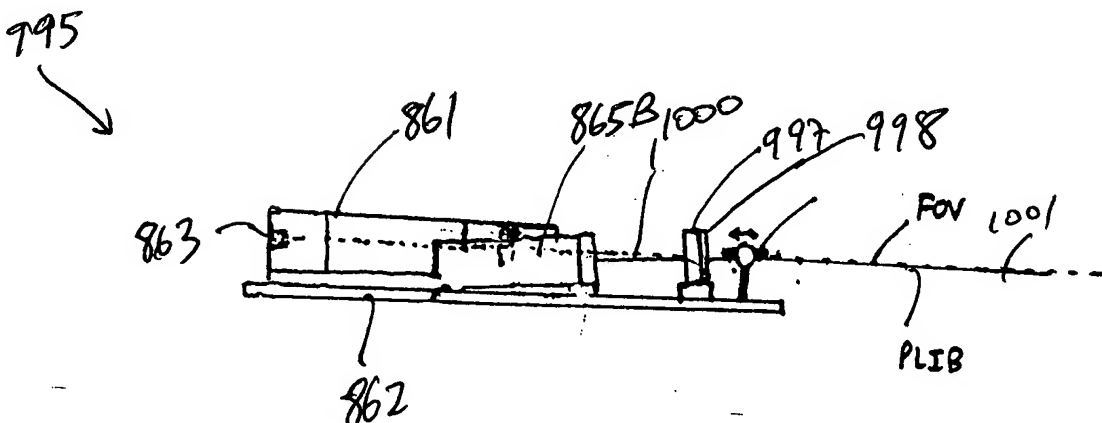


FIG. 1I25NZ

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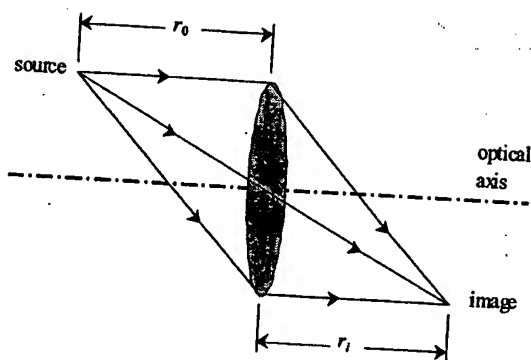


FIG. 1H1

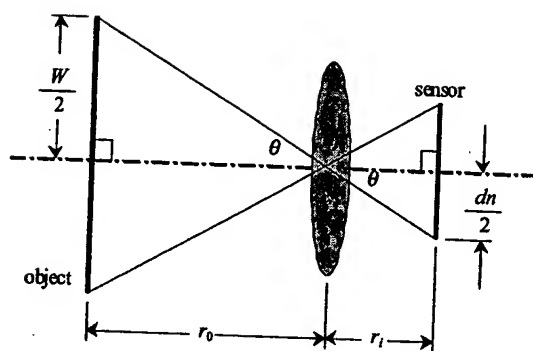


FIG. 1H2

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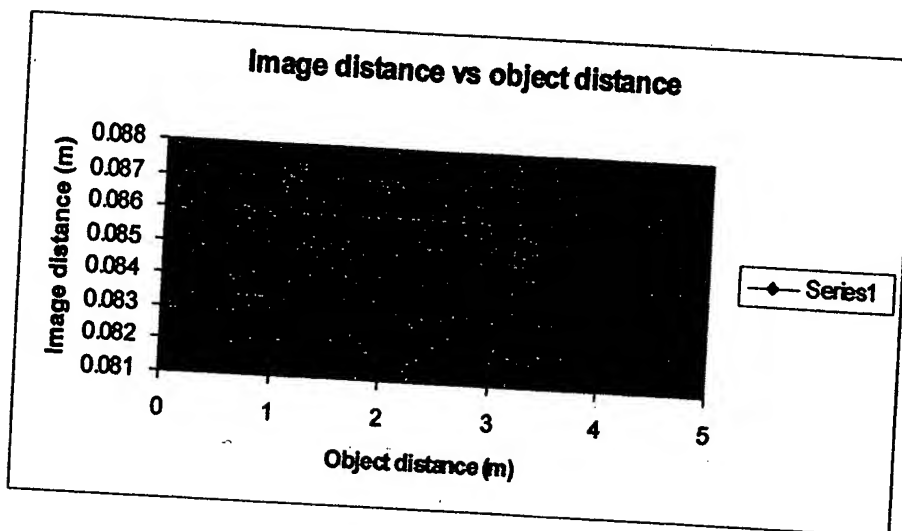


FIG. 1H3

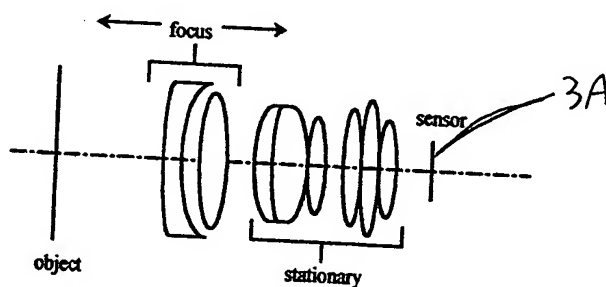


FIG. 1H4

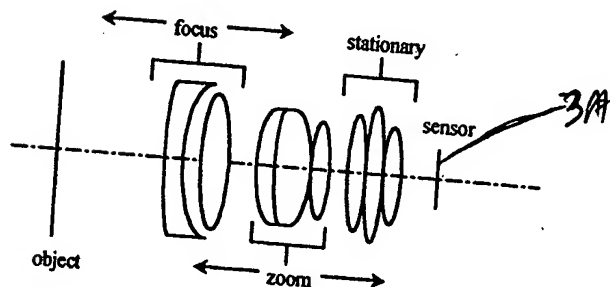
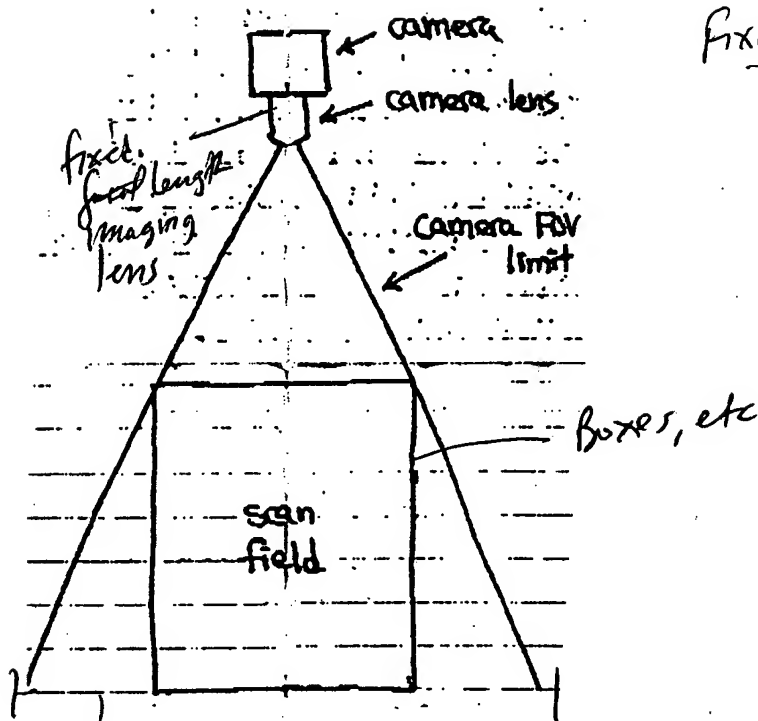


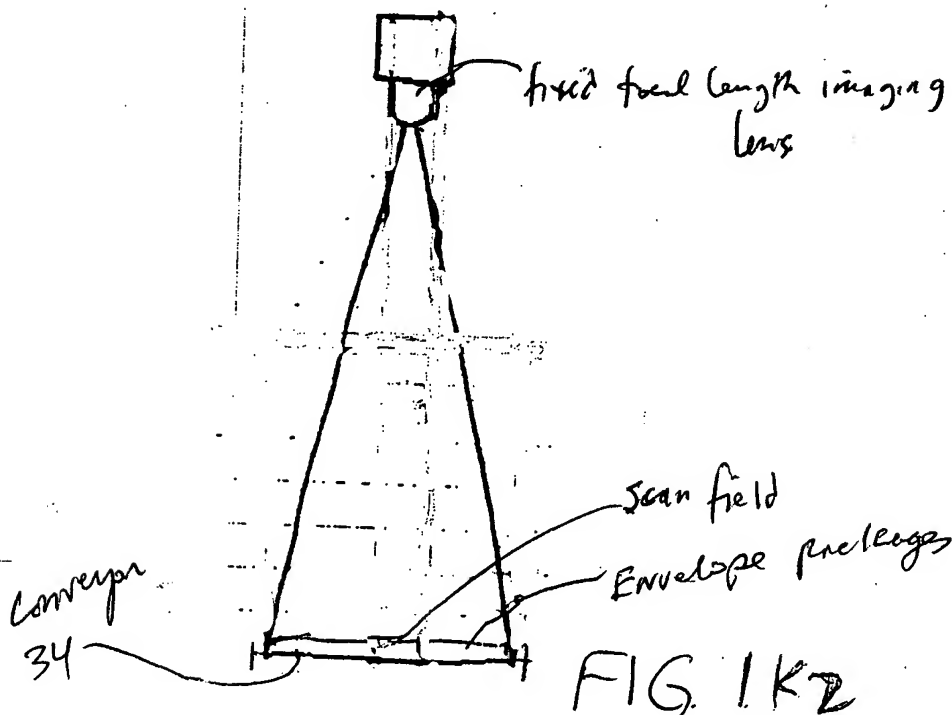
FIG. 1H5

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Fixed focal length lens
cases

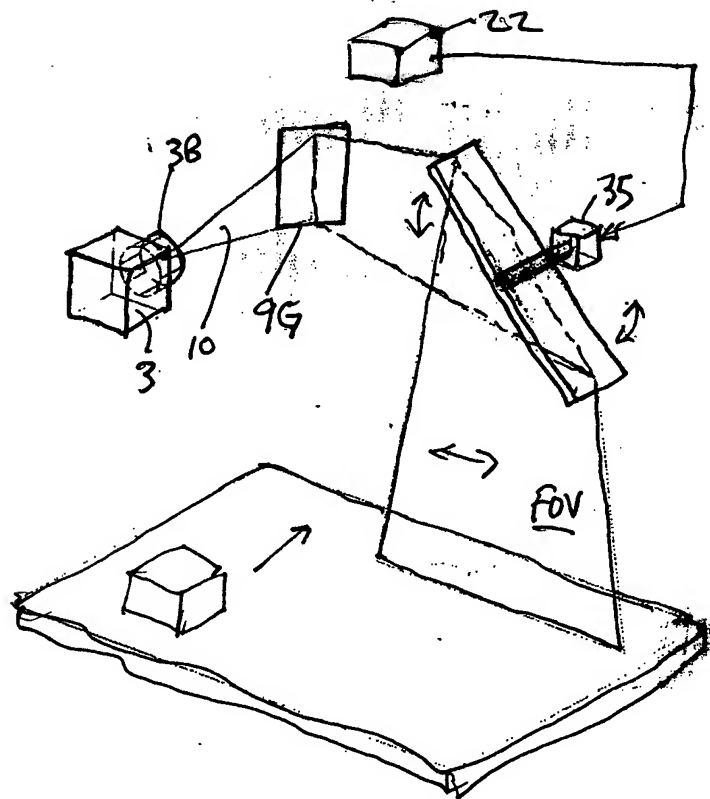
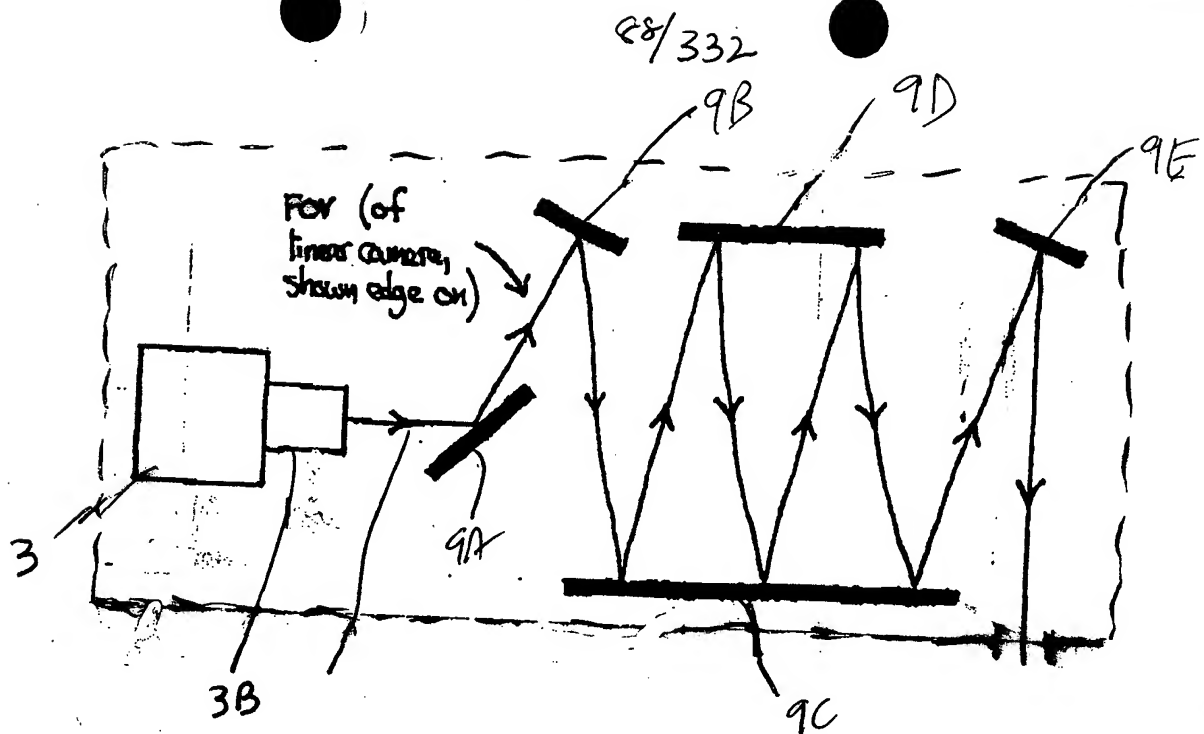


conveyor 34 FIG. 1K1



conveyor 34

FIG. 1K2



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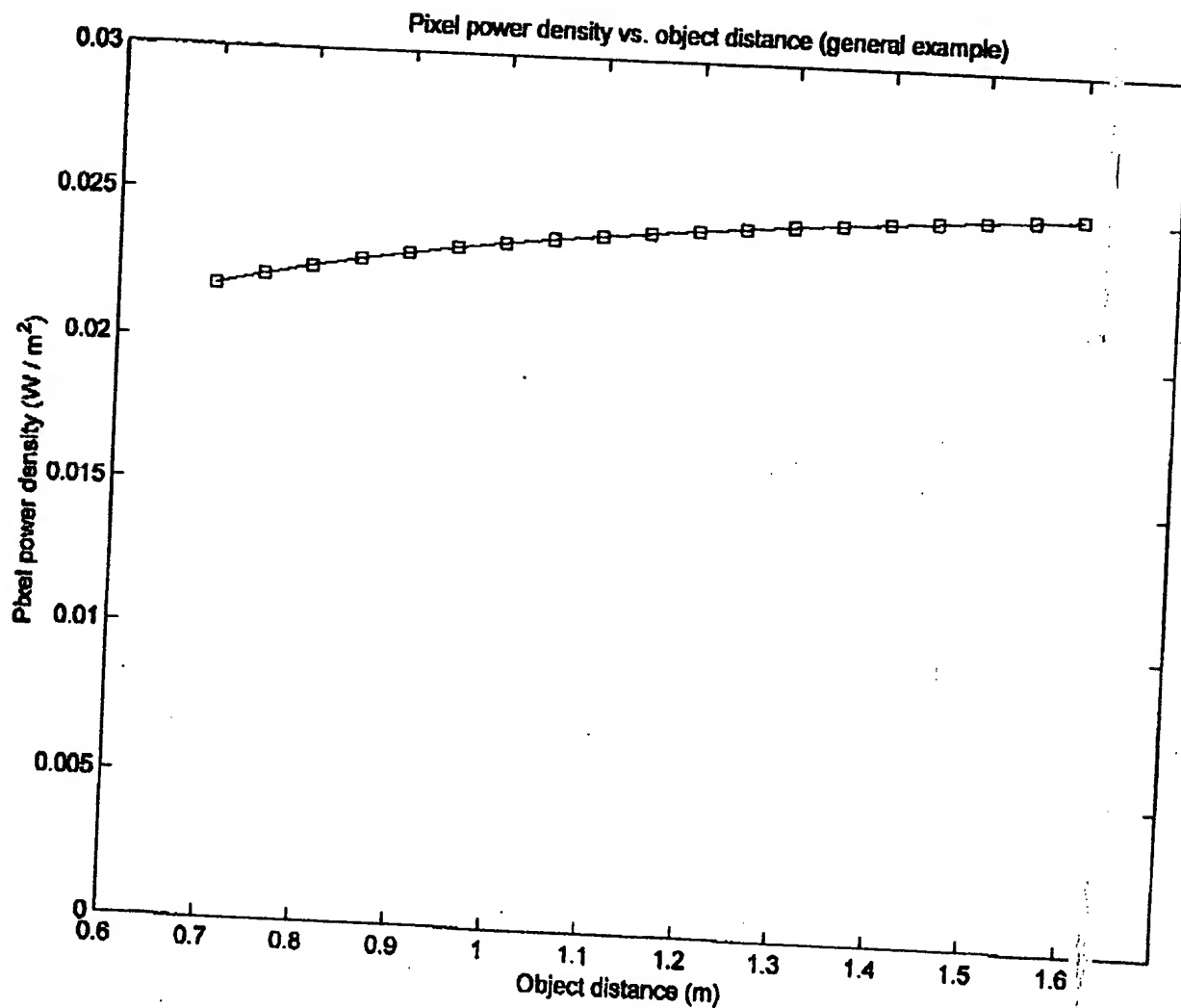


FIG-1M1

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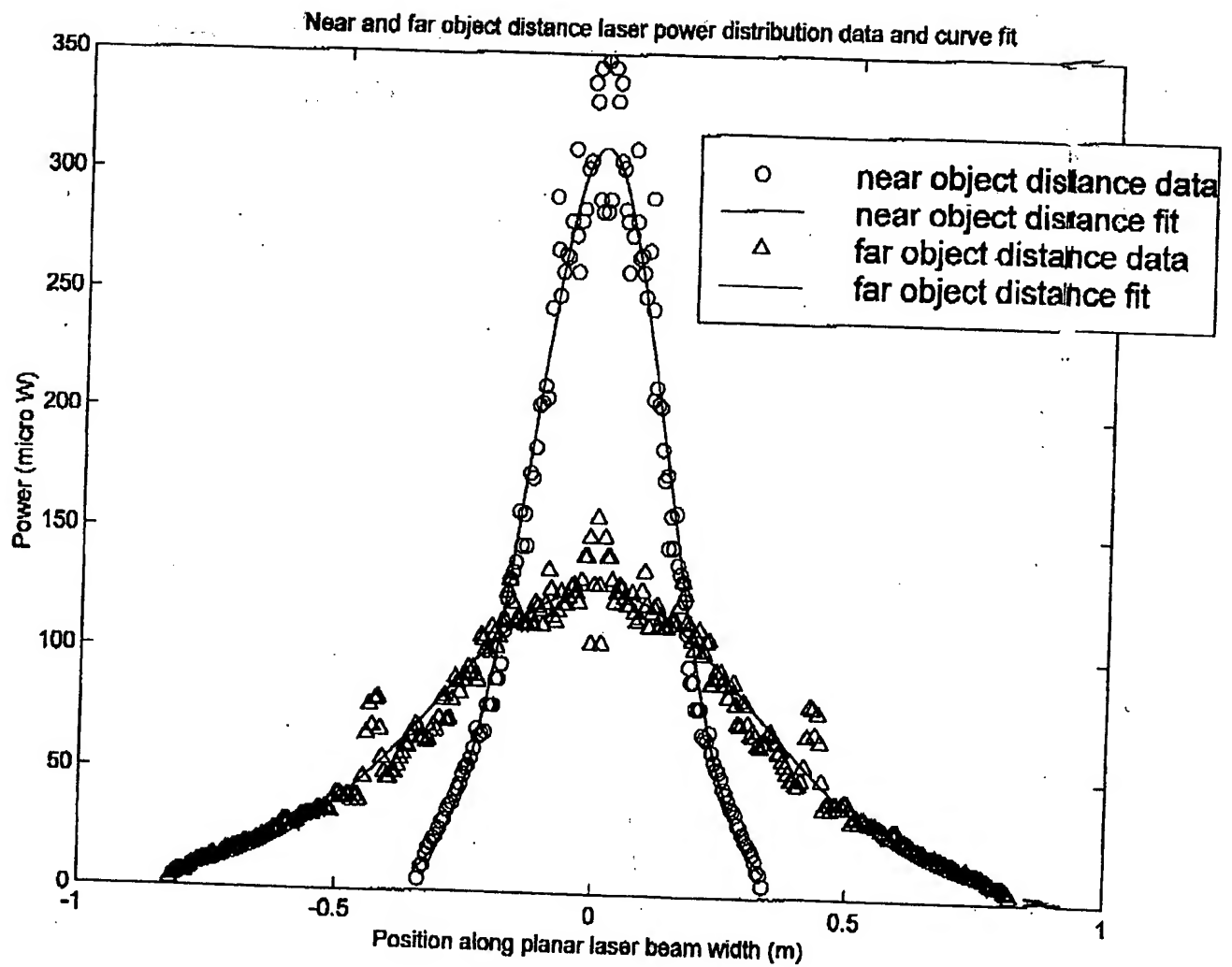


FIG. 1M2

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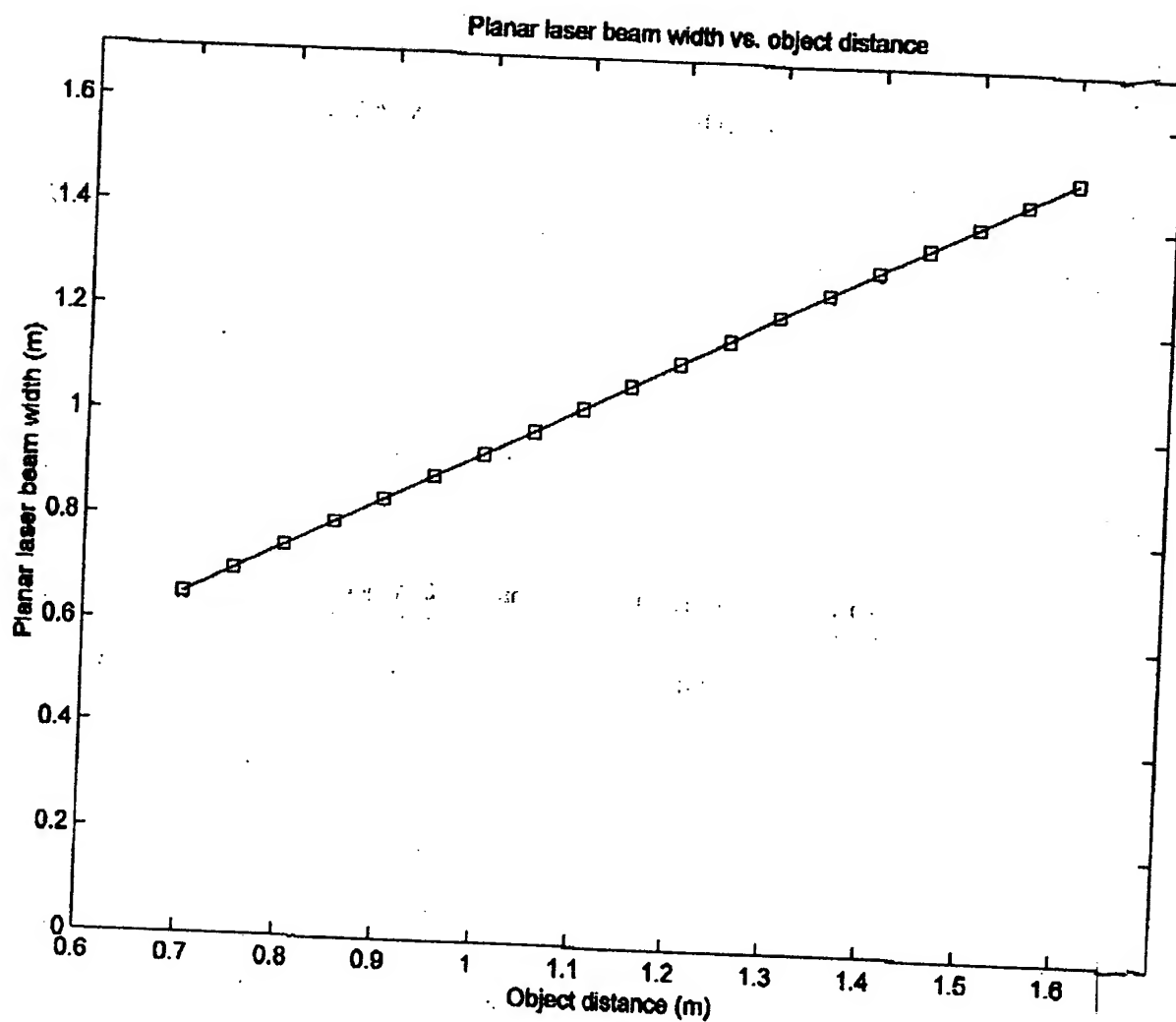


FIG. 1M3

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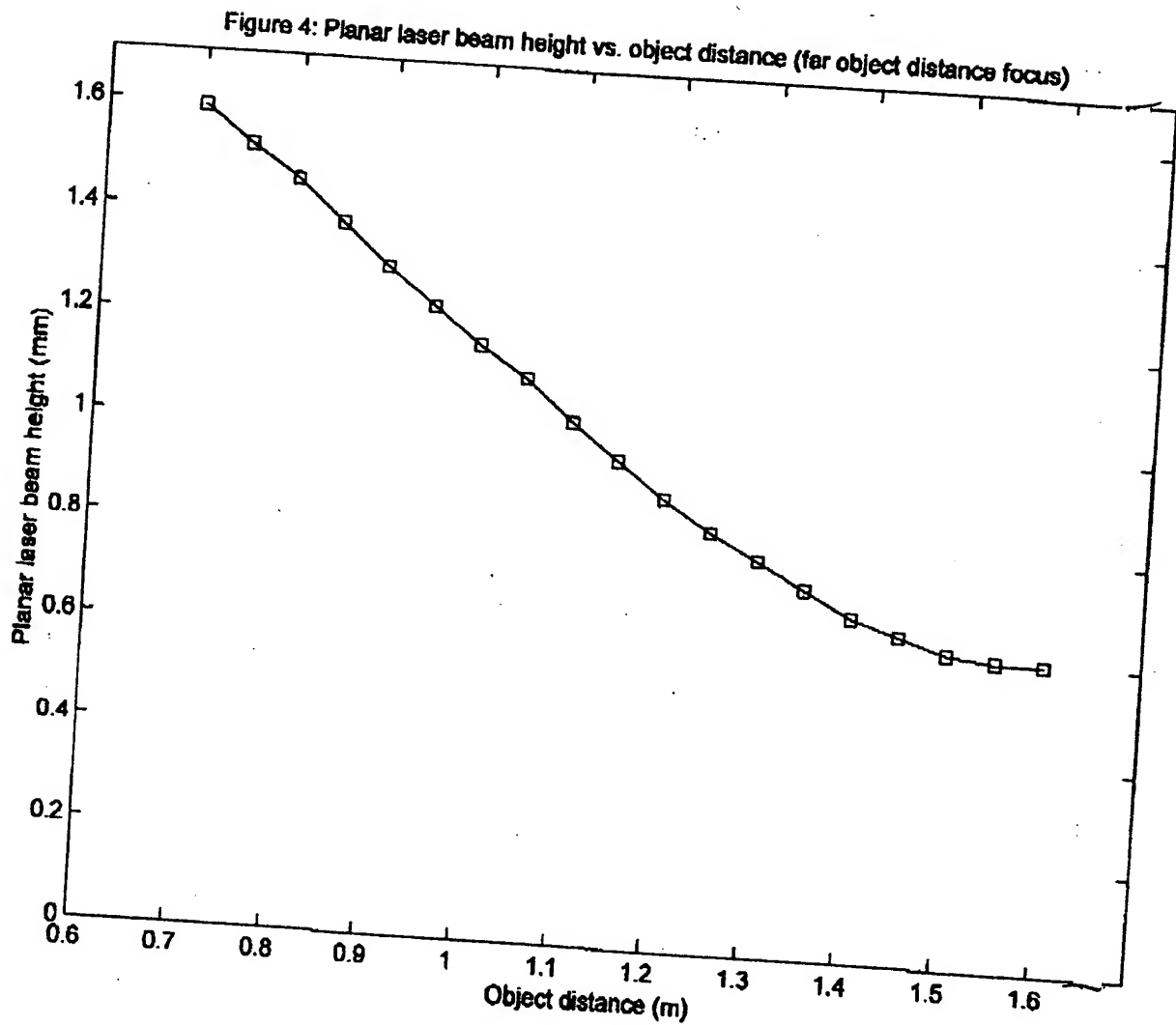


FIG. 1M4

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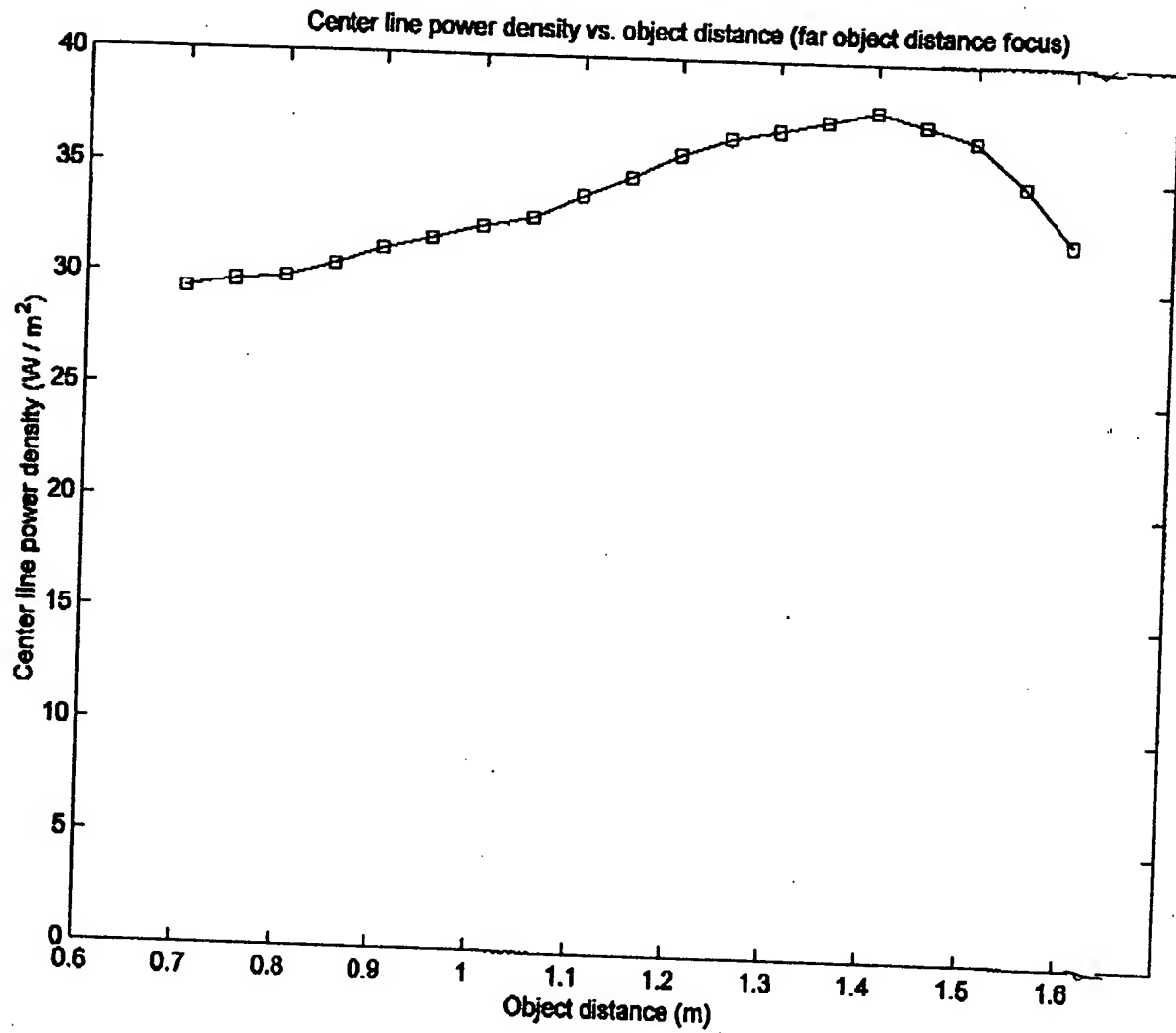


FIG. -IN

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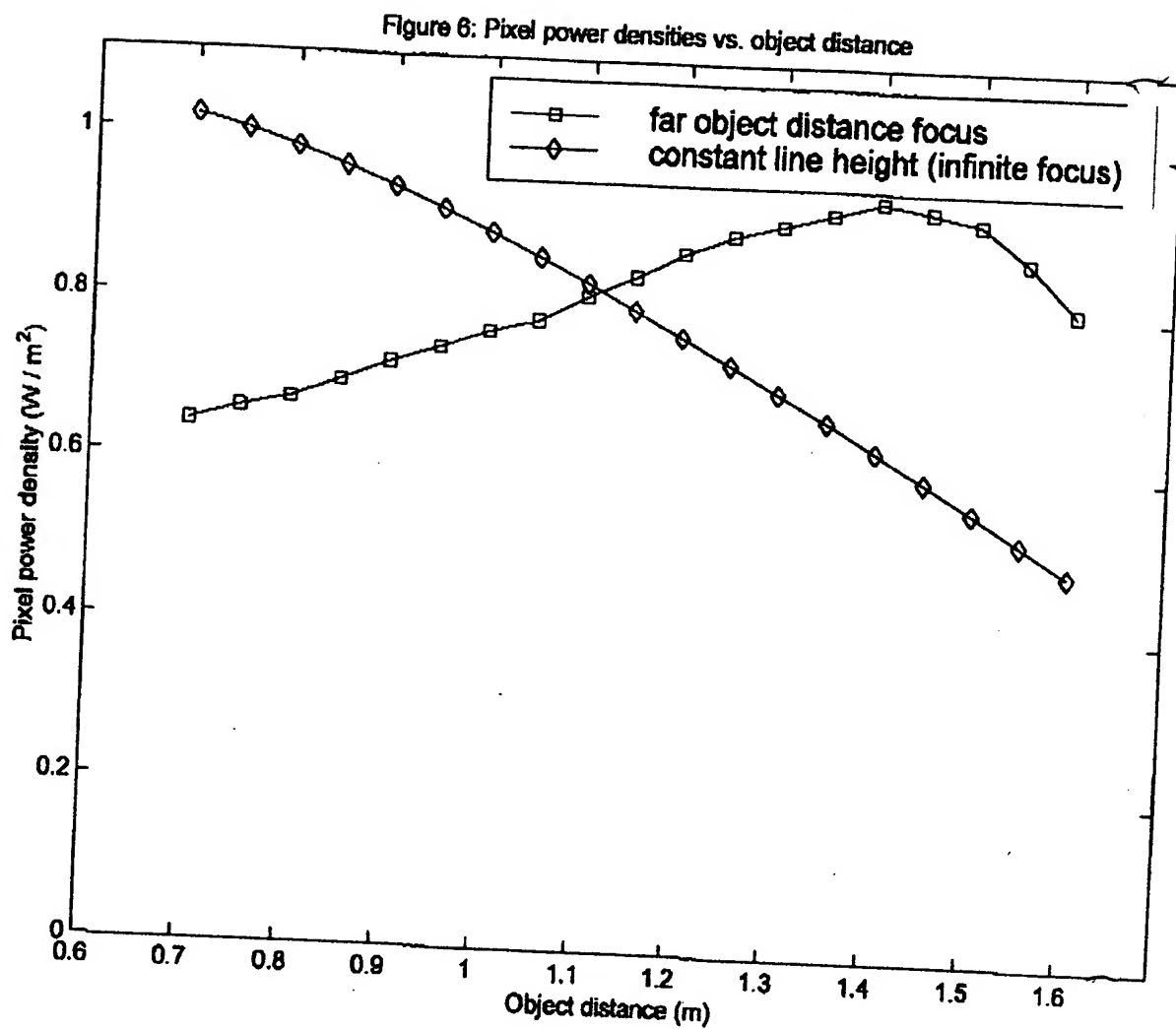


FIG. 10

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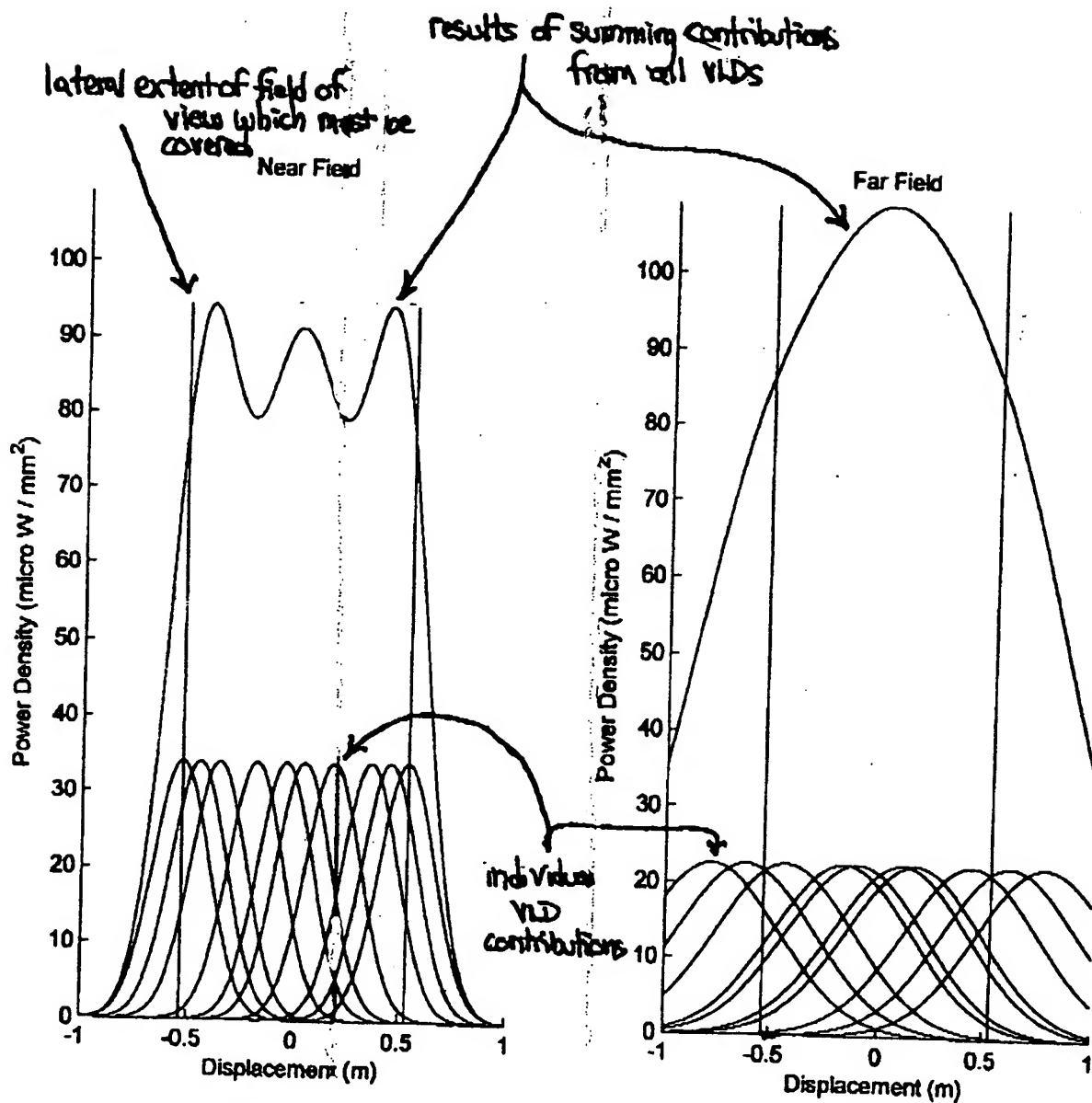


FIG 1P1

FIG 1P2

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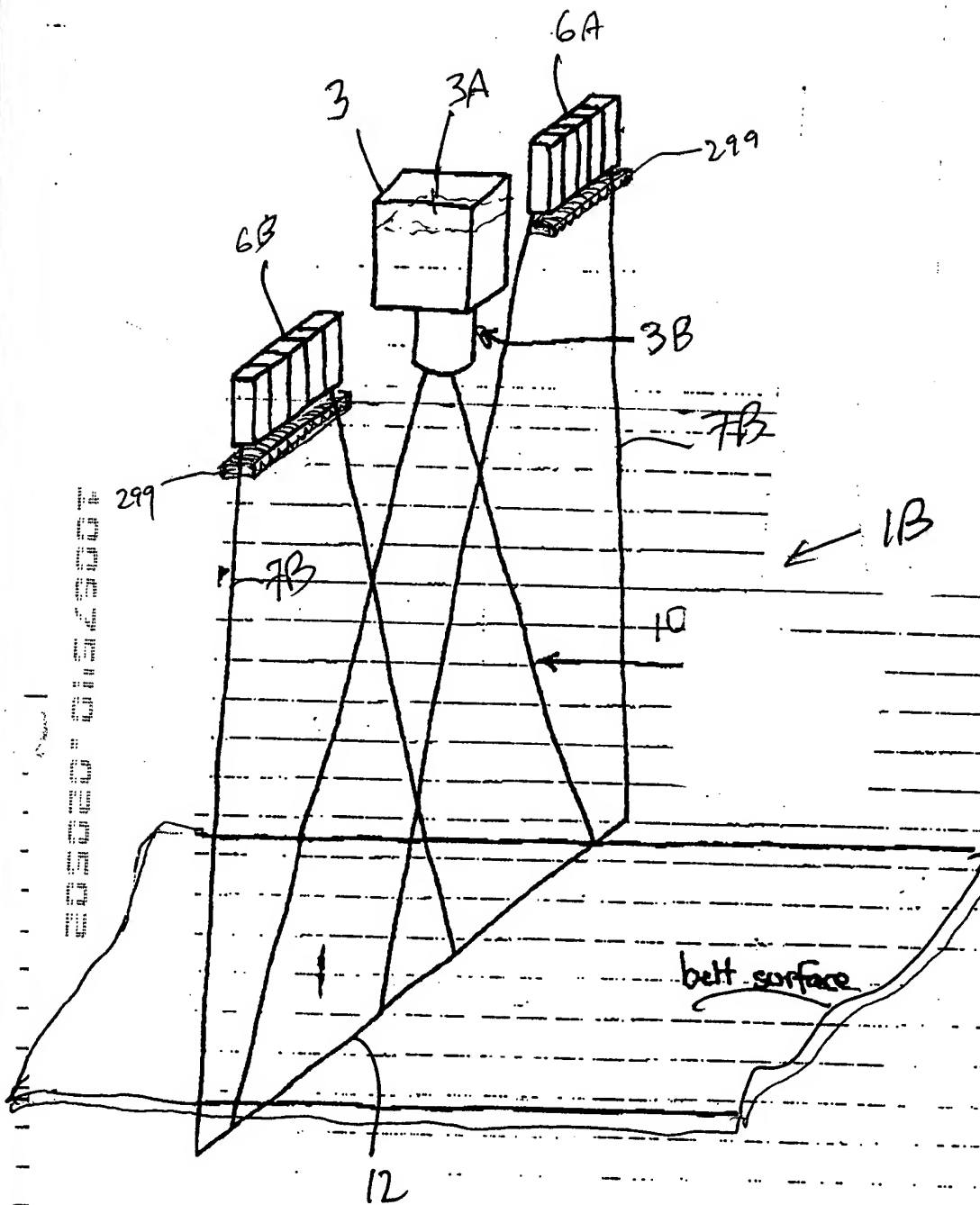


FIG. 101

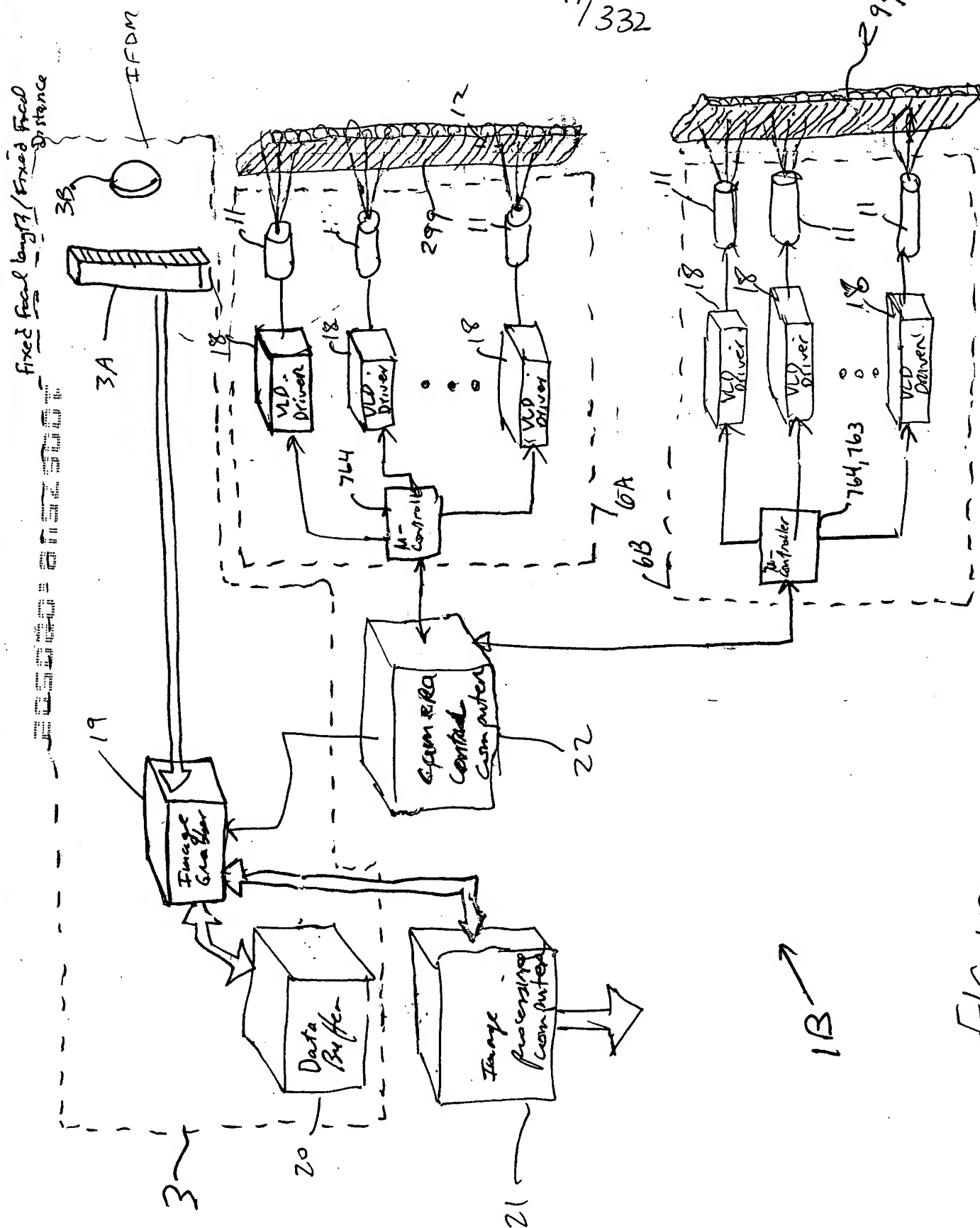
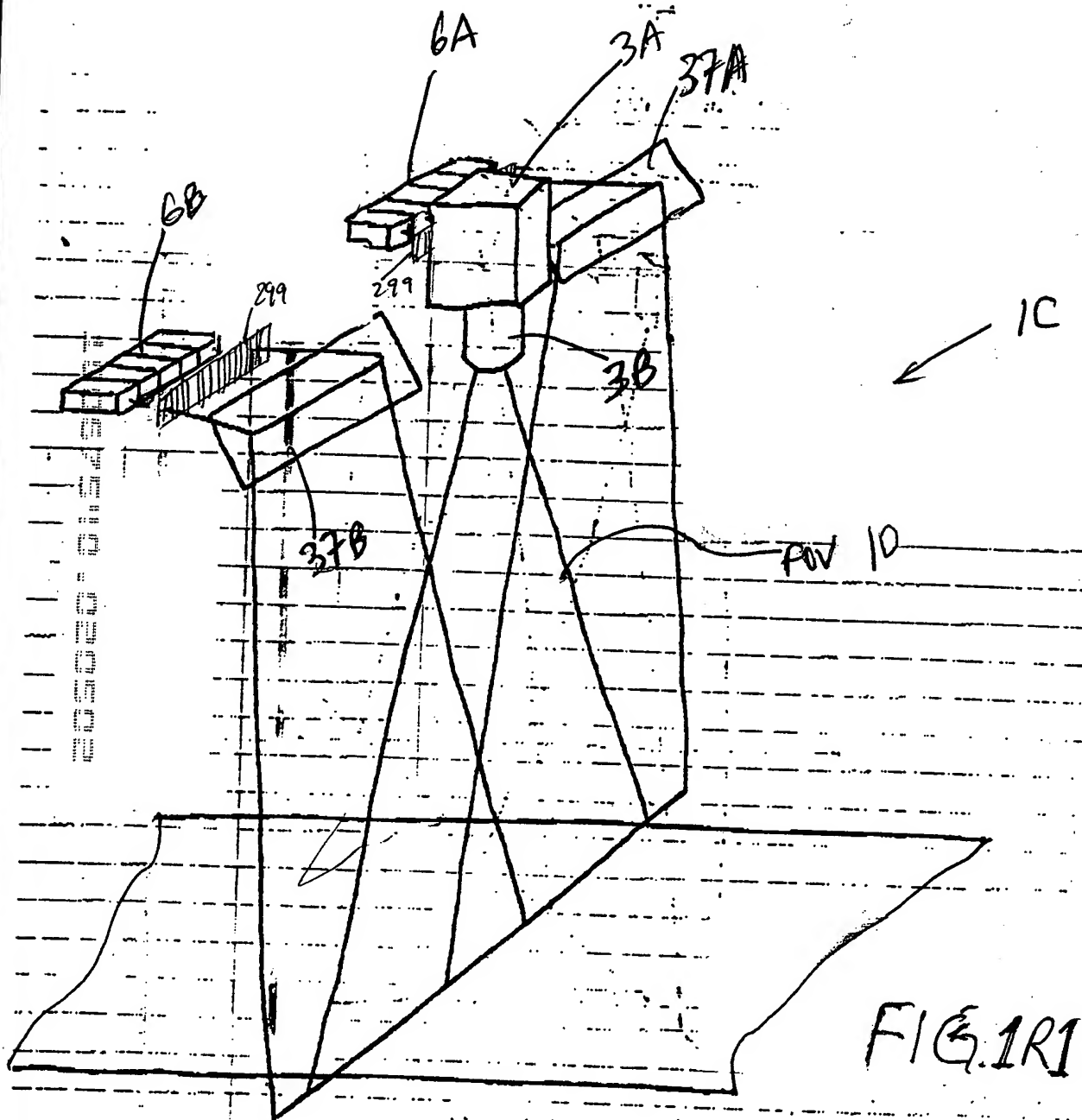
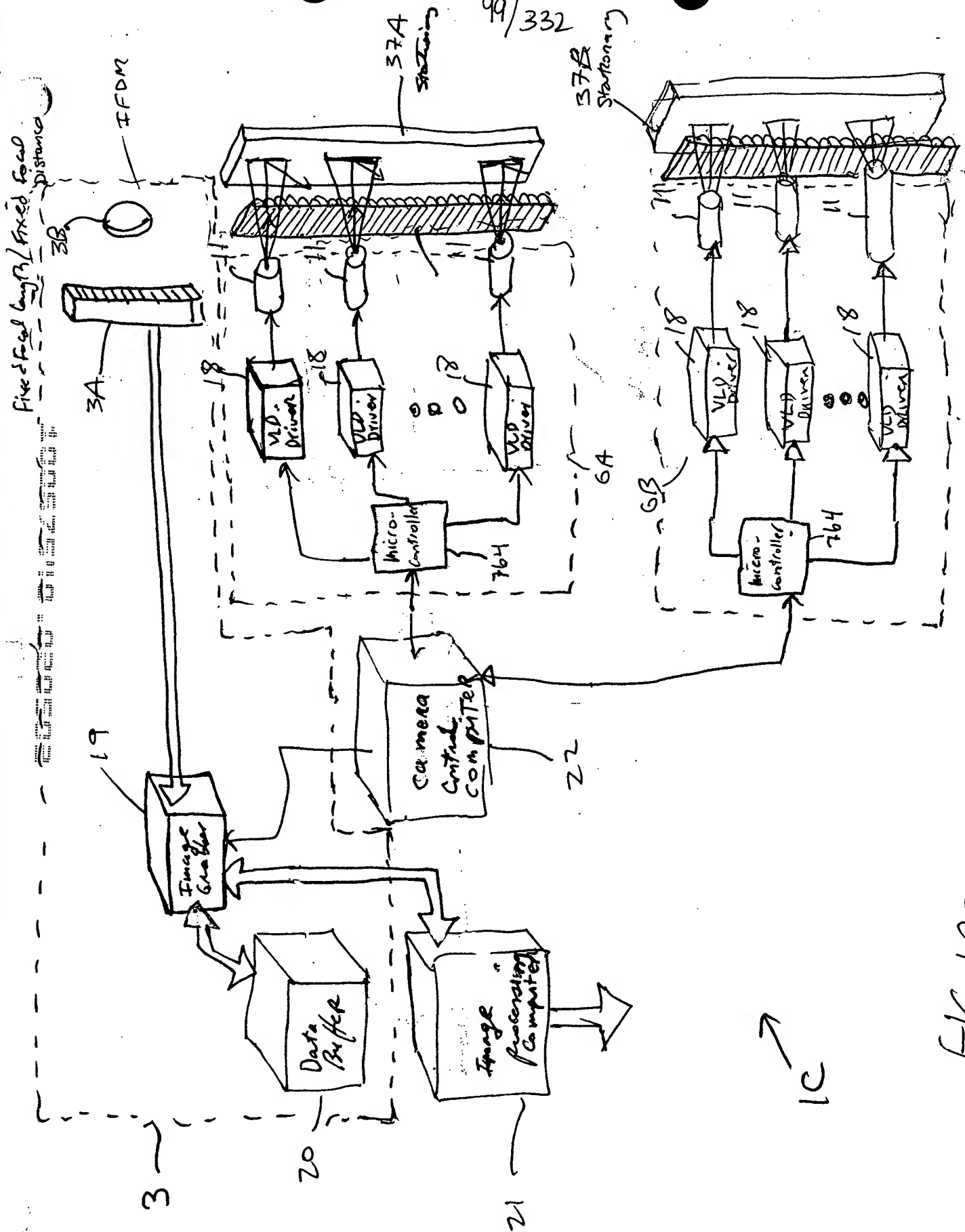


FIG. 102

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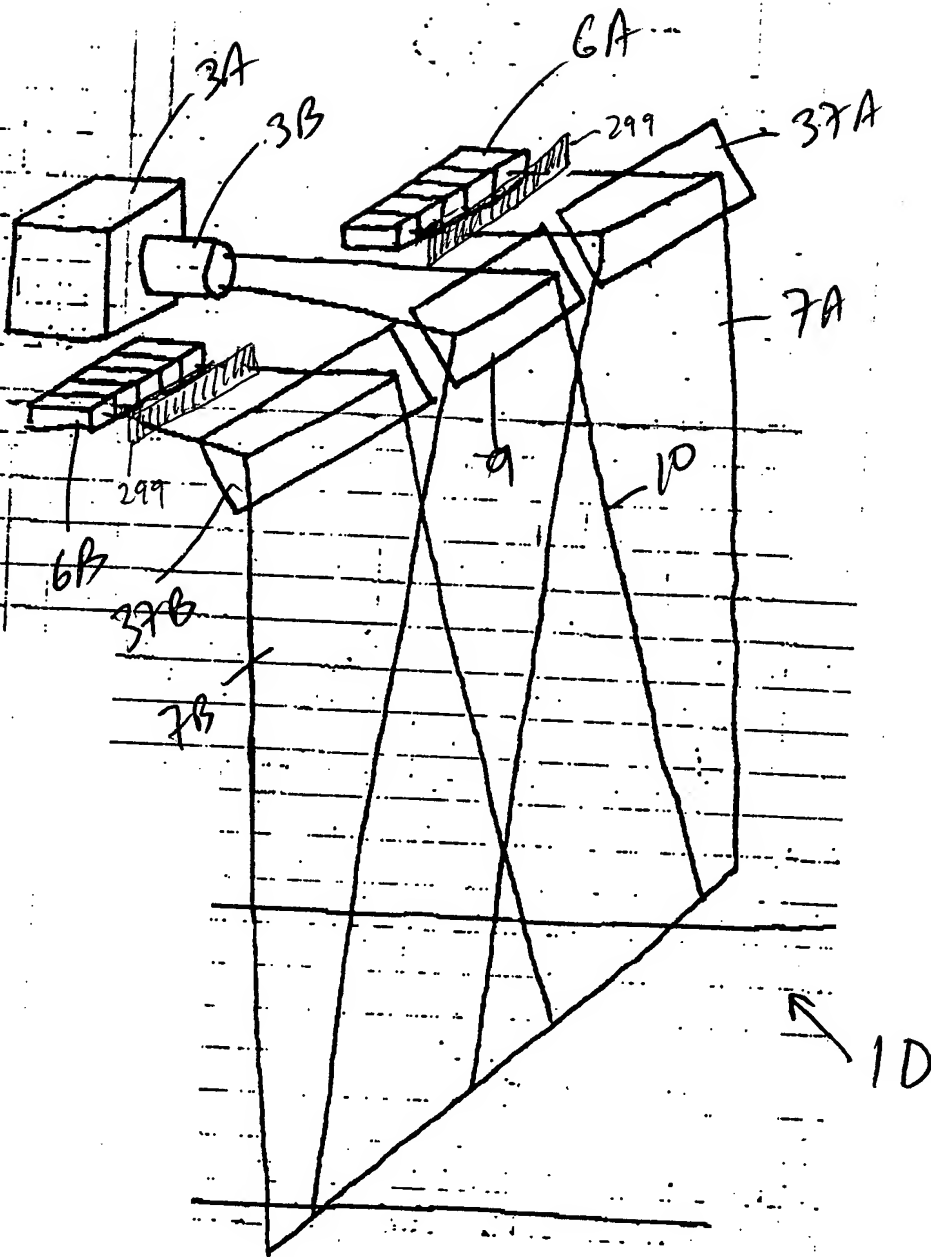
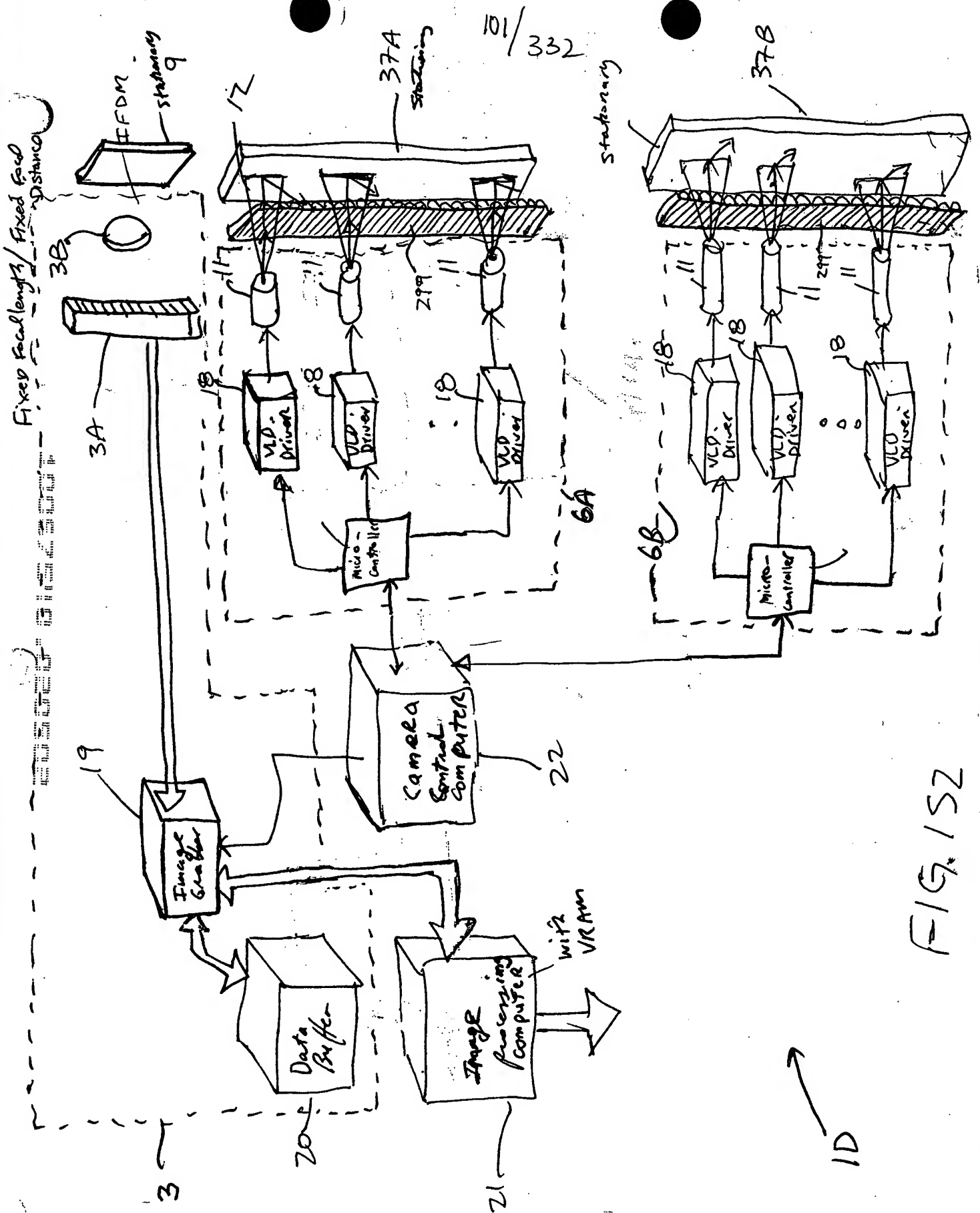


FIG. 1S1



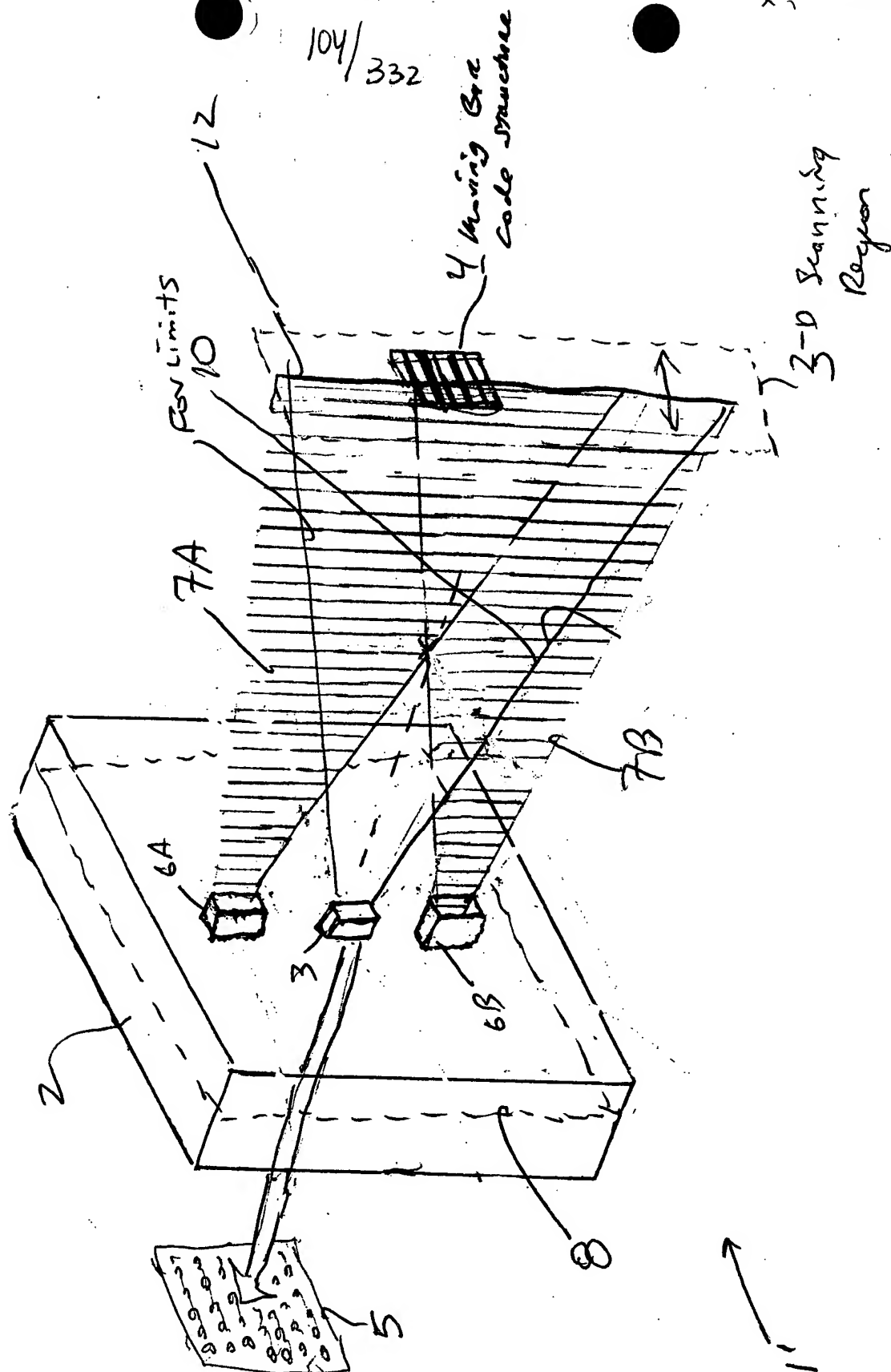
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FIG. 1VI

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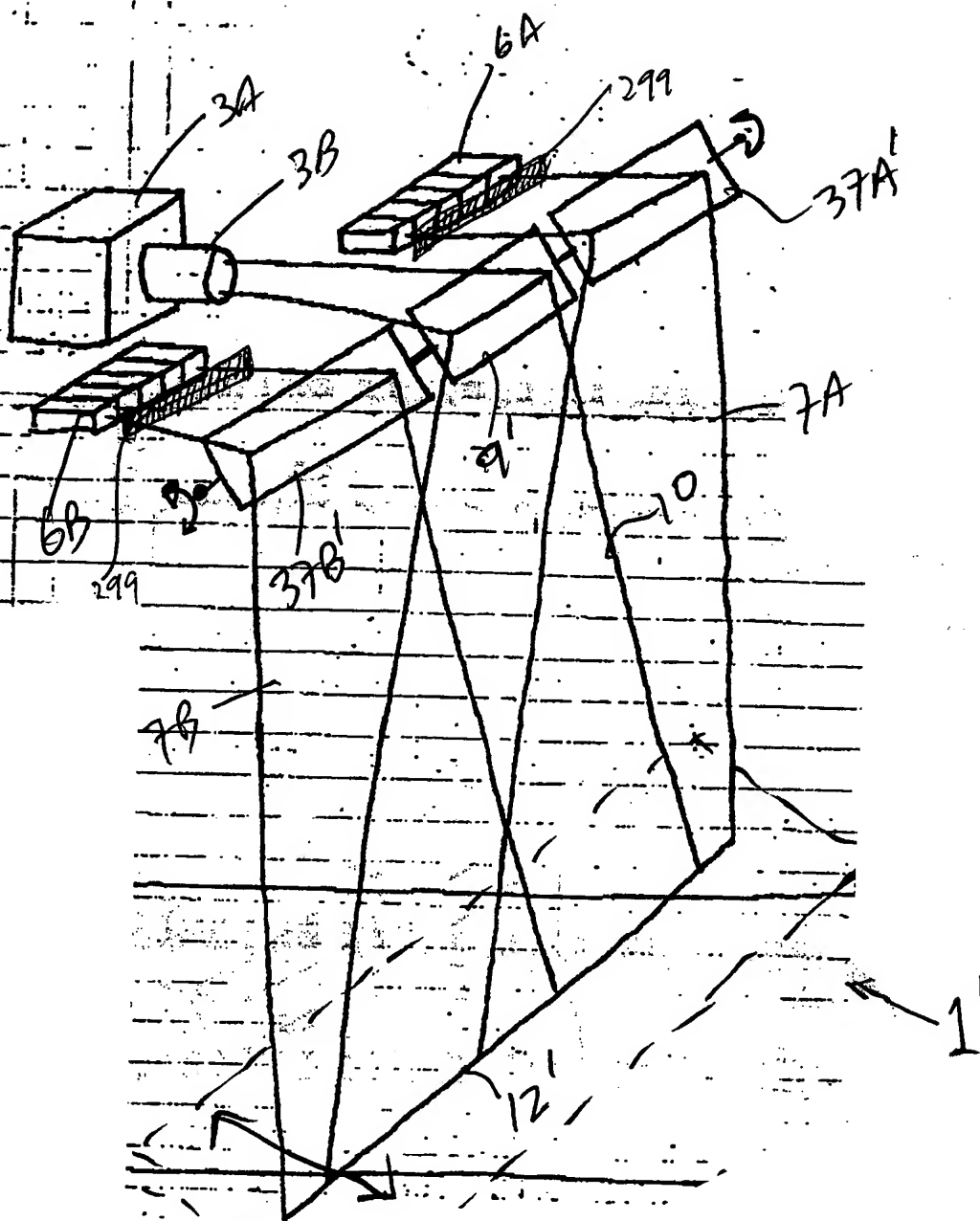


FIG. IV2

2-D
region
of
space

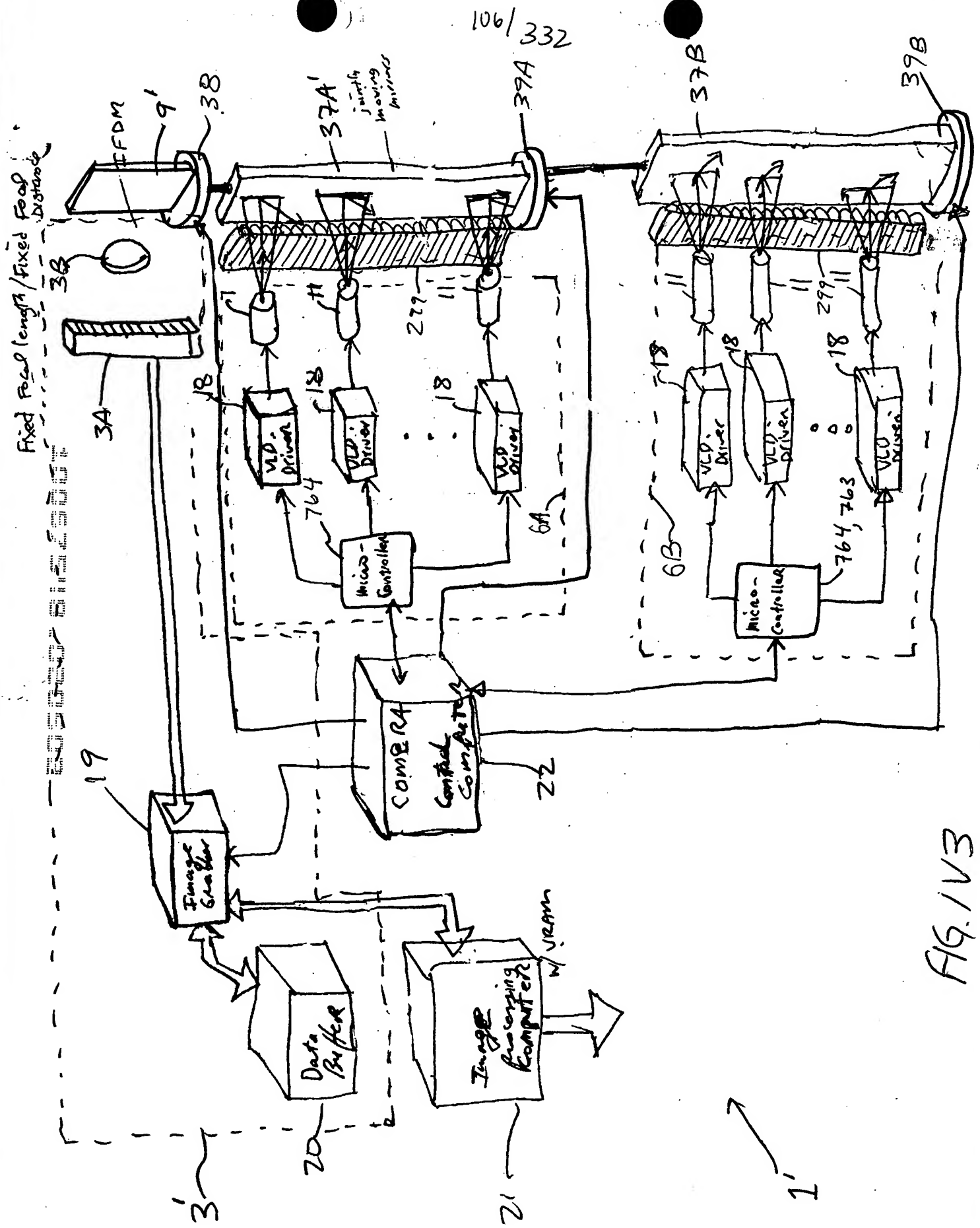


FIG. 1V3

CO

CO

SECRET

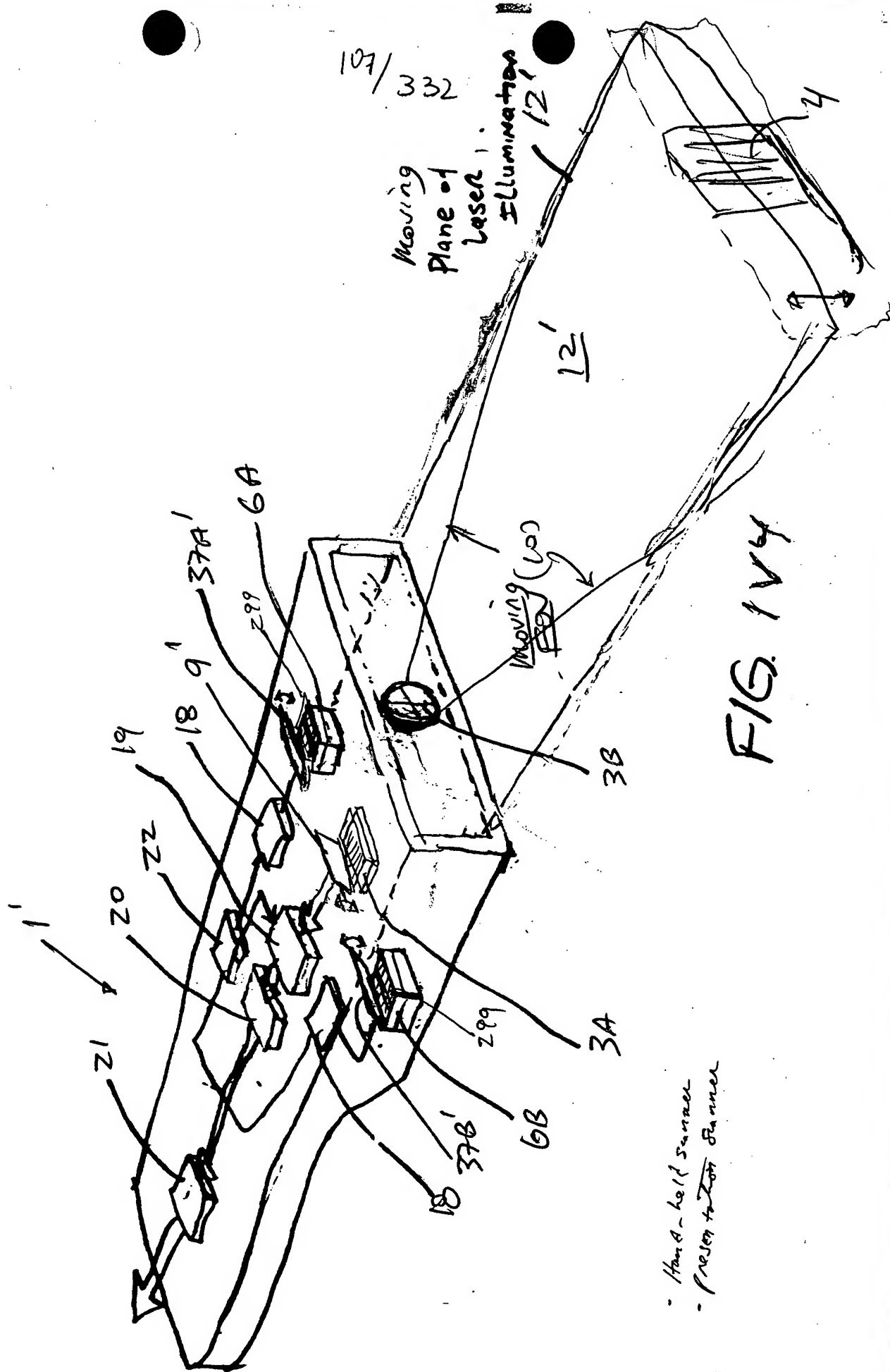


FIG. 1V4

- Hand-held scanner
- Presley to Zon Scanner

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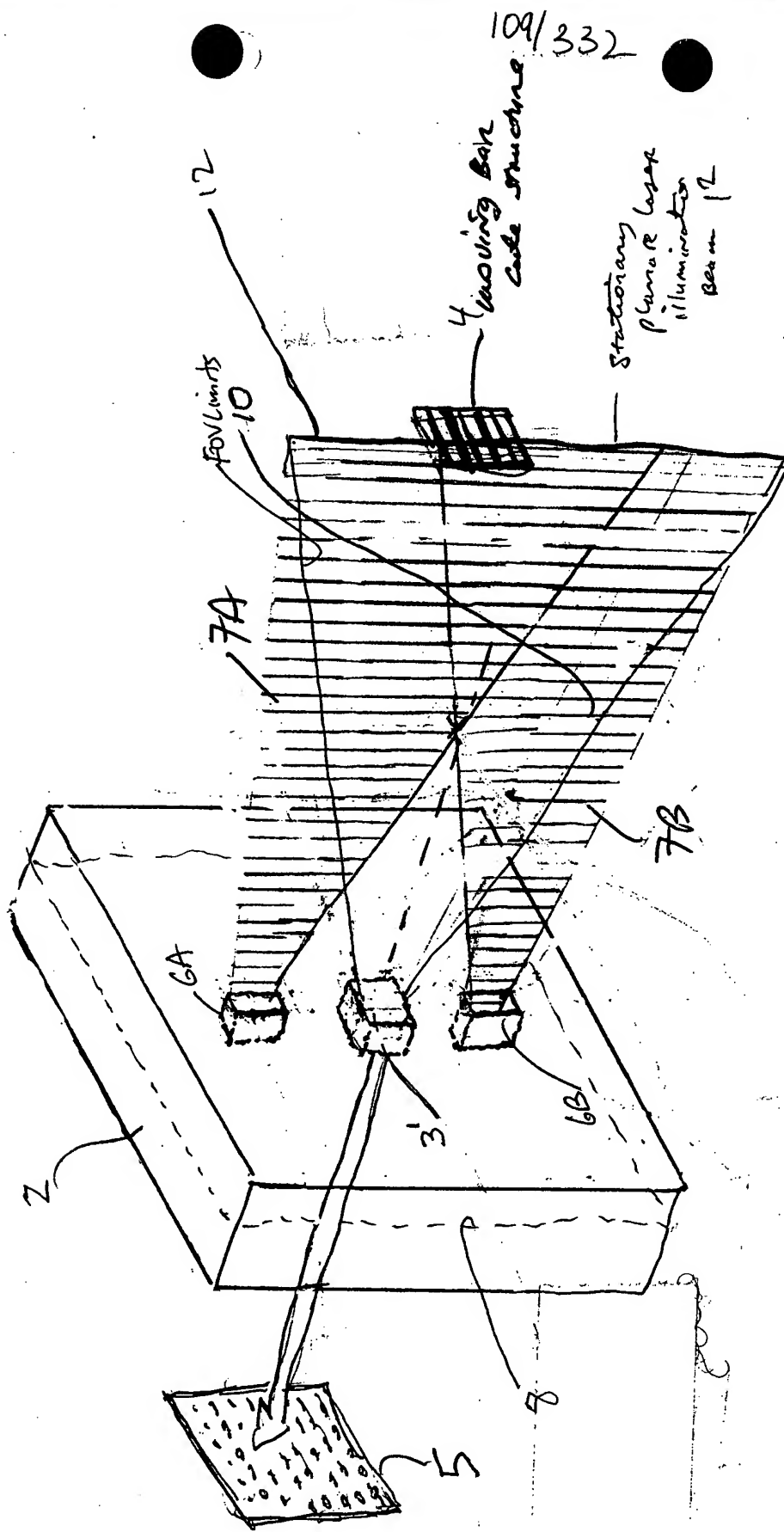


FIG. 2A

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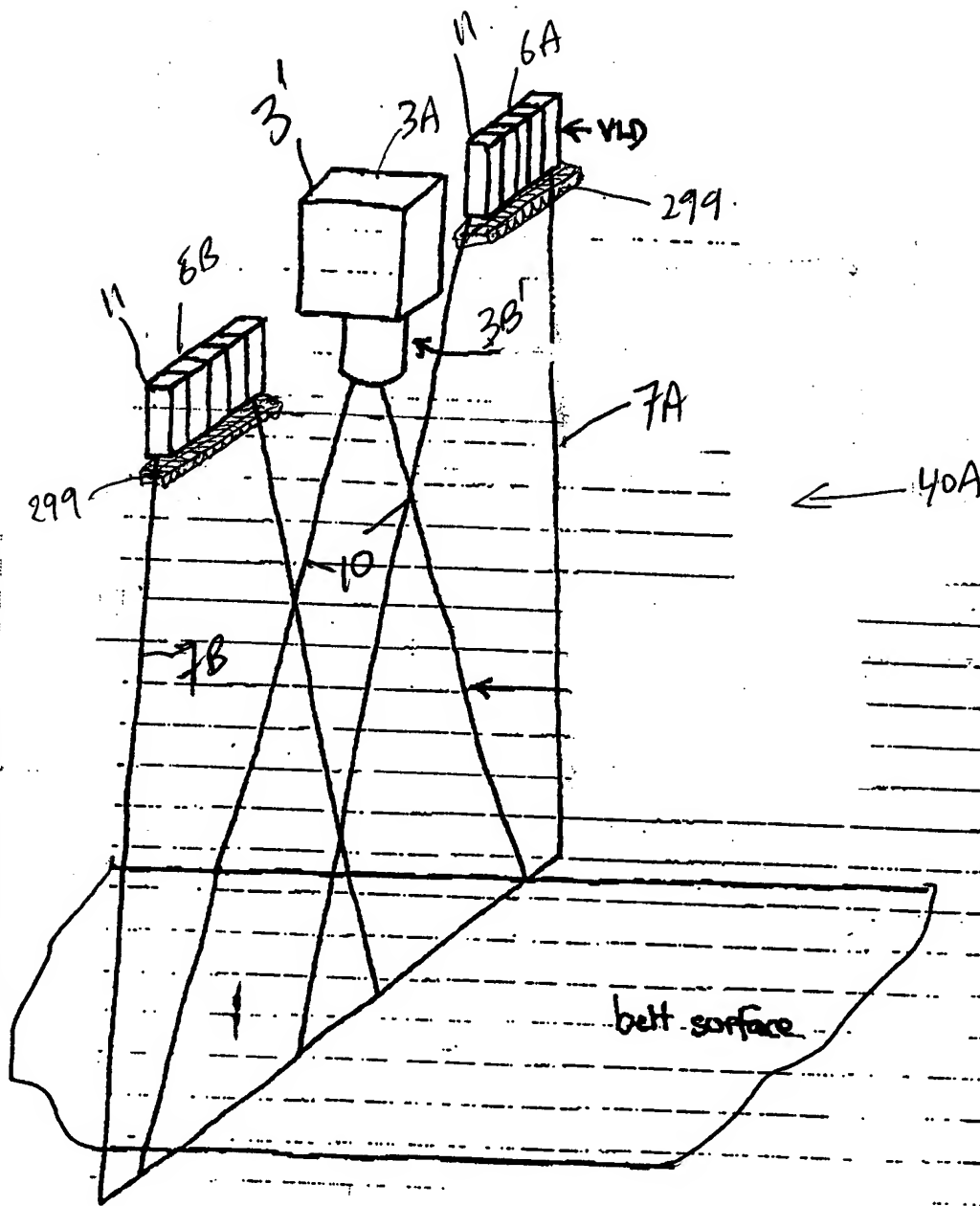
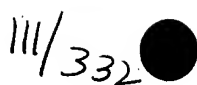


FIG. 2 B1



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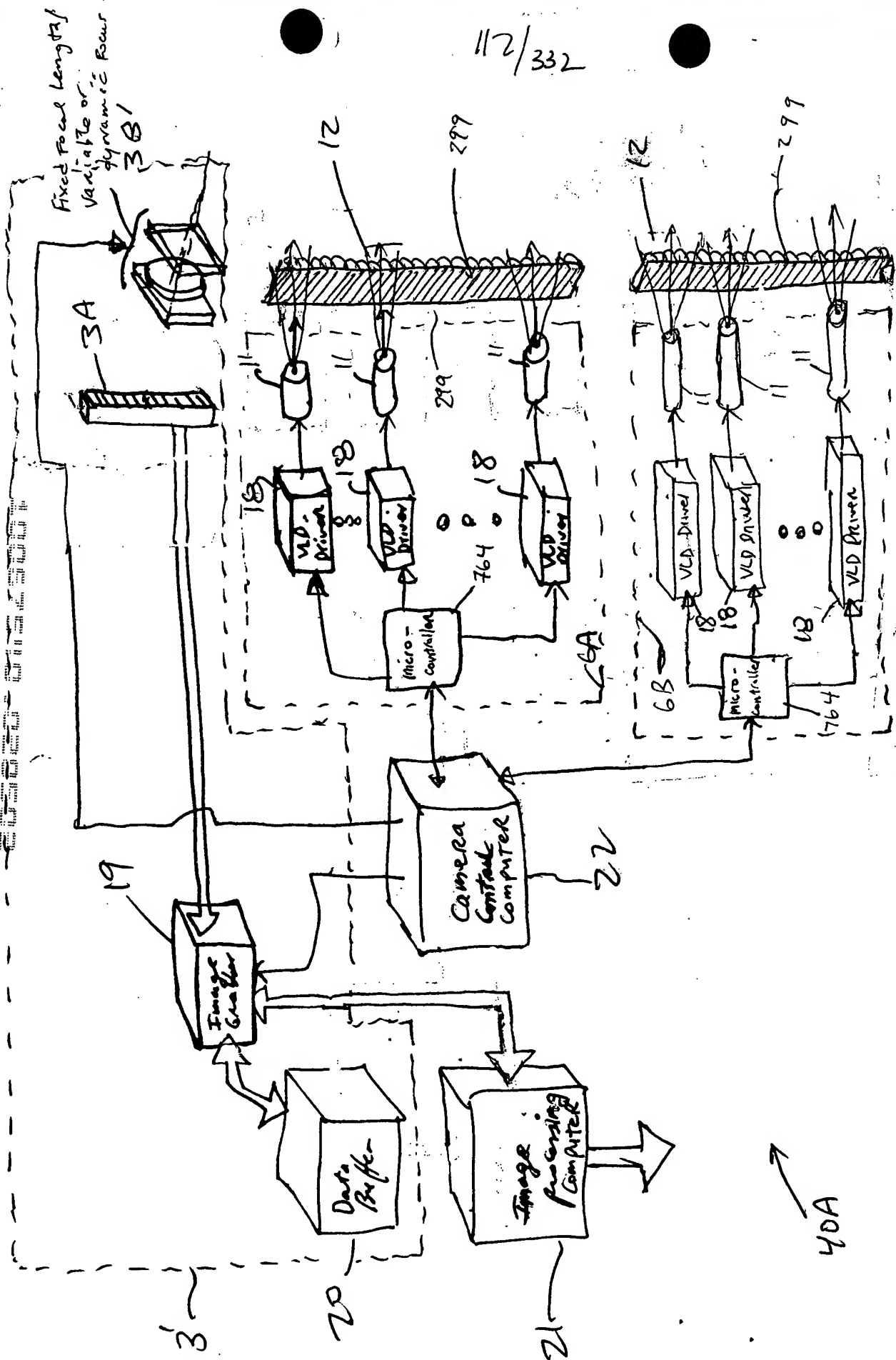
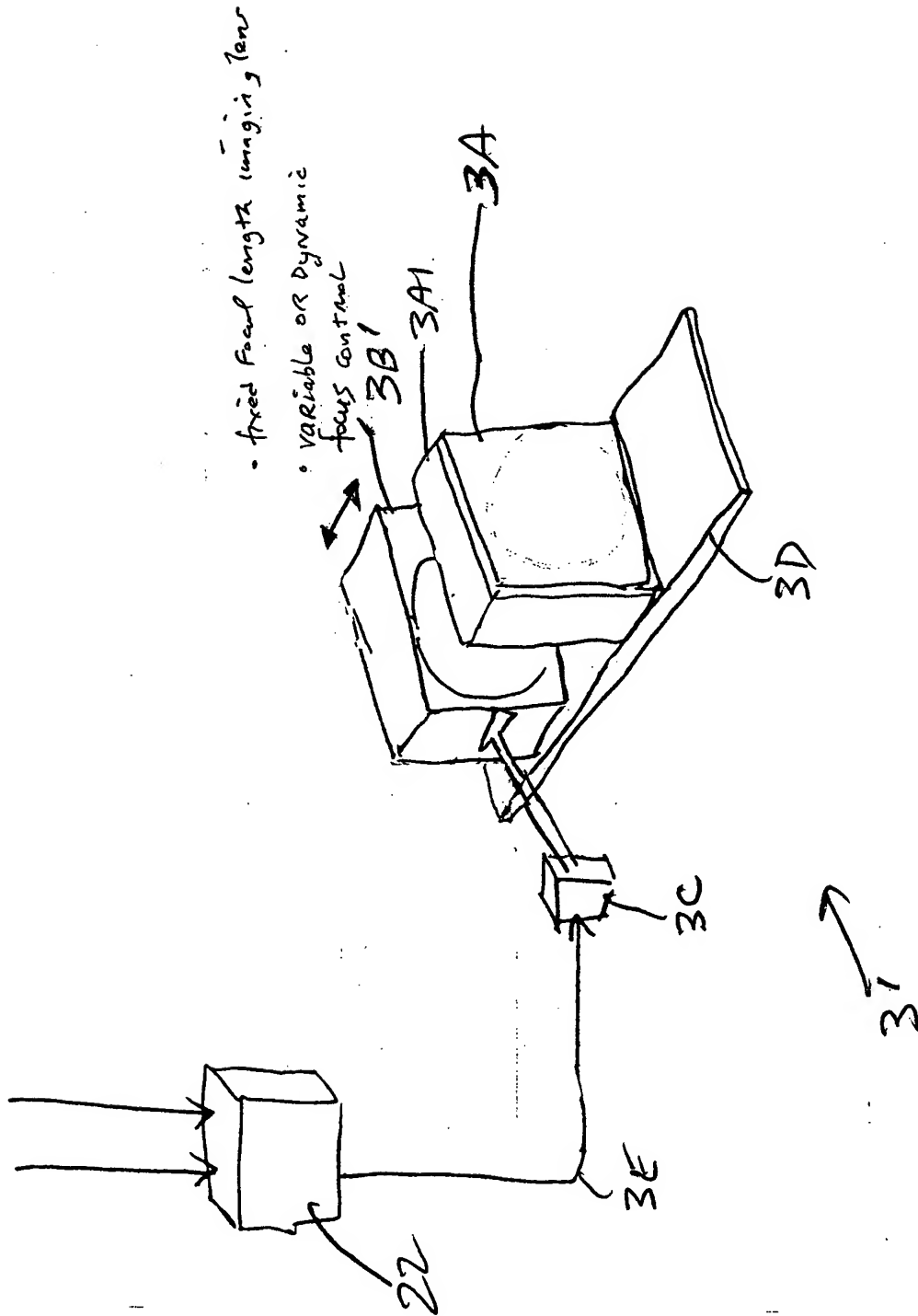


FIG. 2C1



• fixed focal length imaging lens
• variable or dynamic focus control

FIG. 2C2

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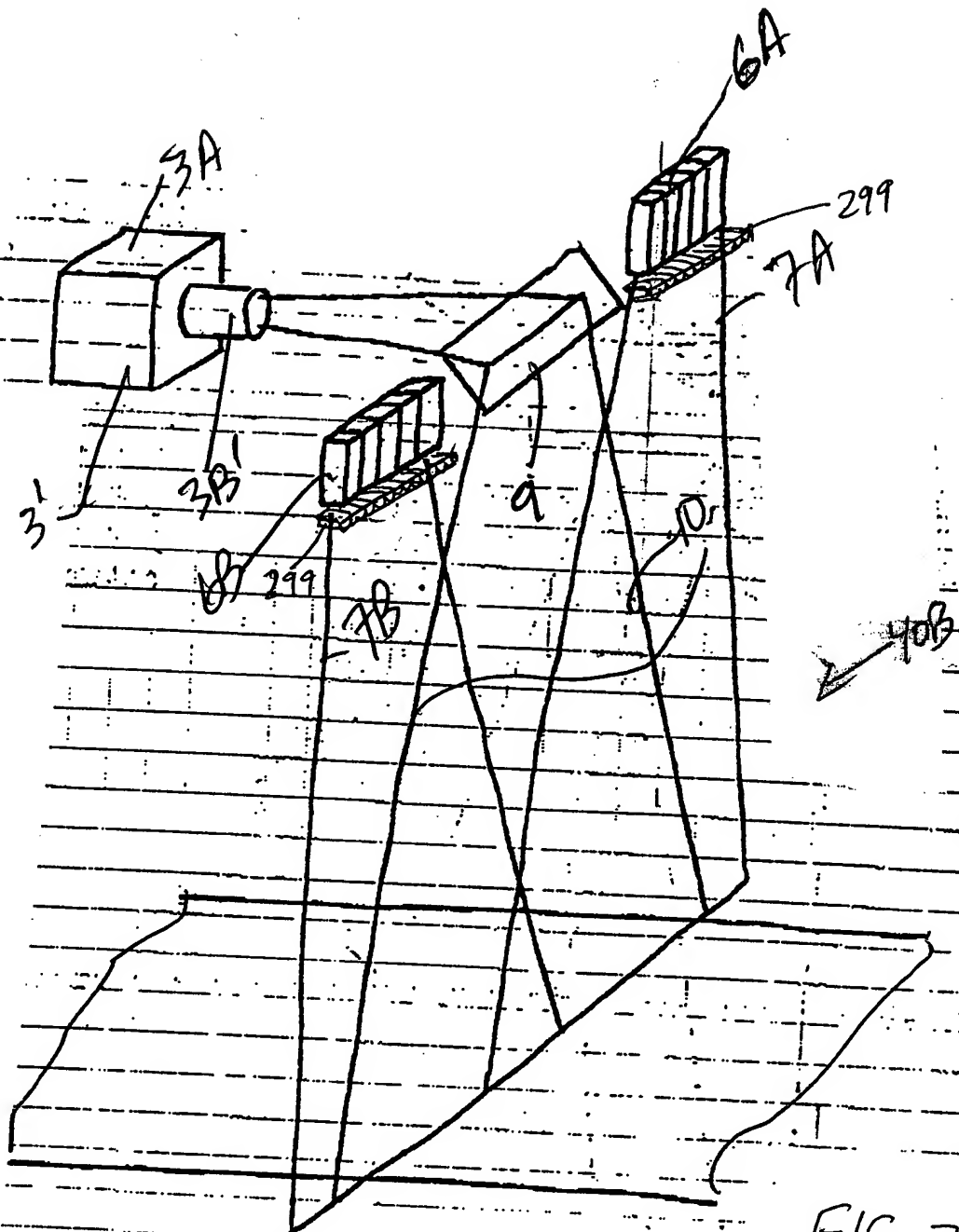


FIG. 2D1

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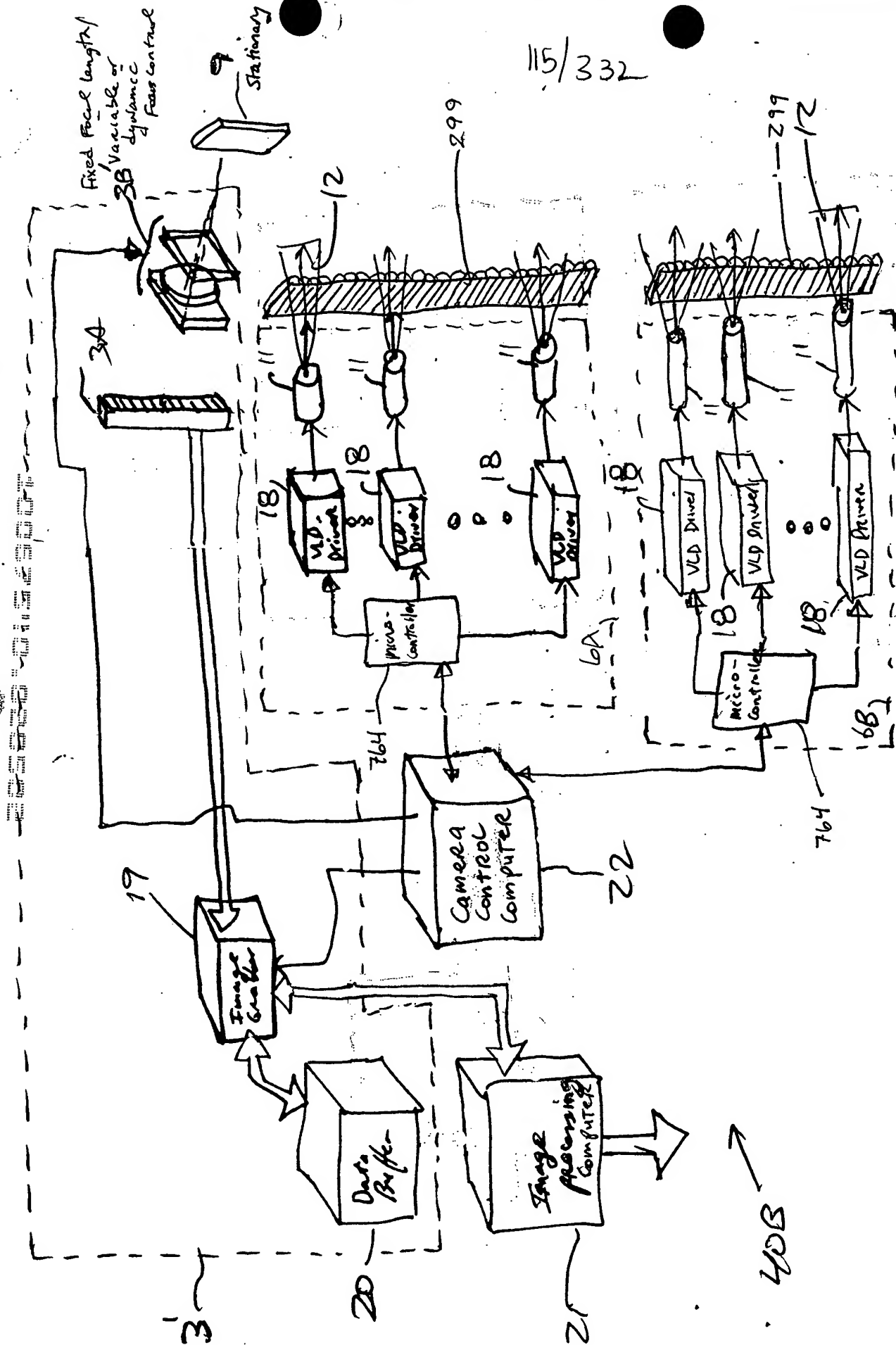
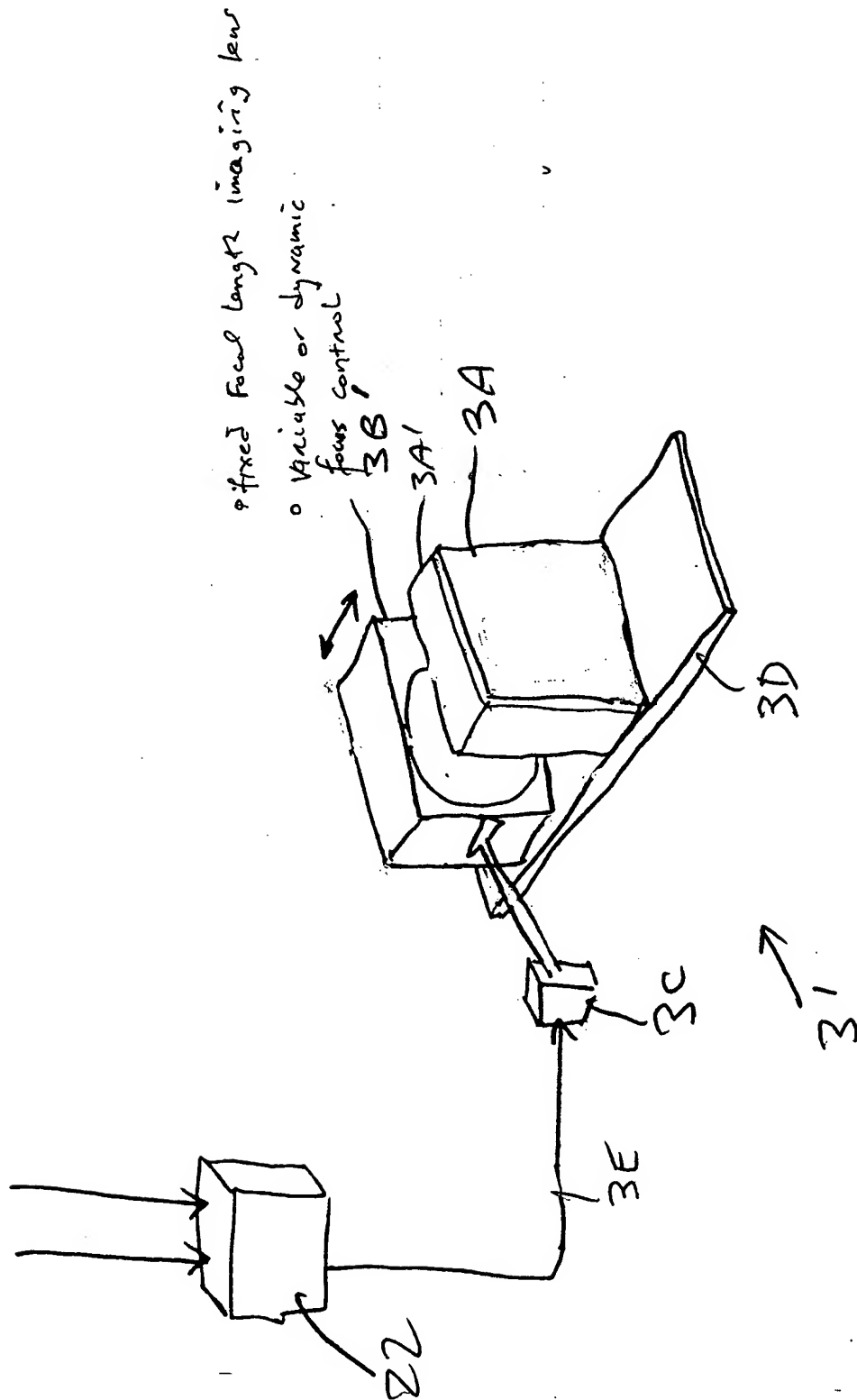


FIG. 2D2

(C)

20500 012500T

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fixed focal length imaging lens
• Variable or dynamic focus control

FIG. 2D3

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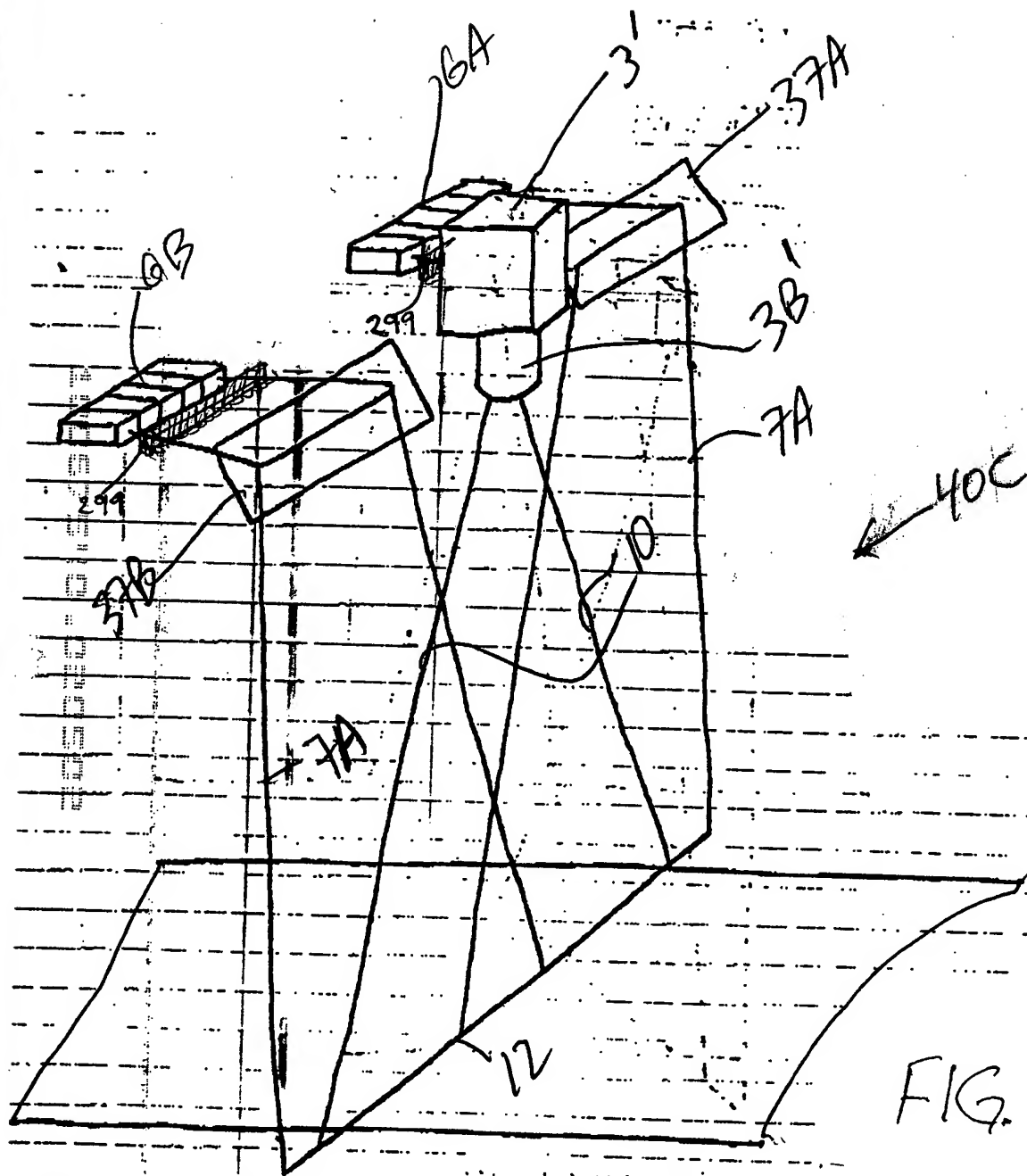
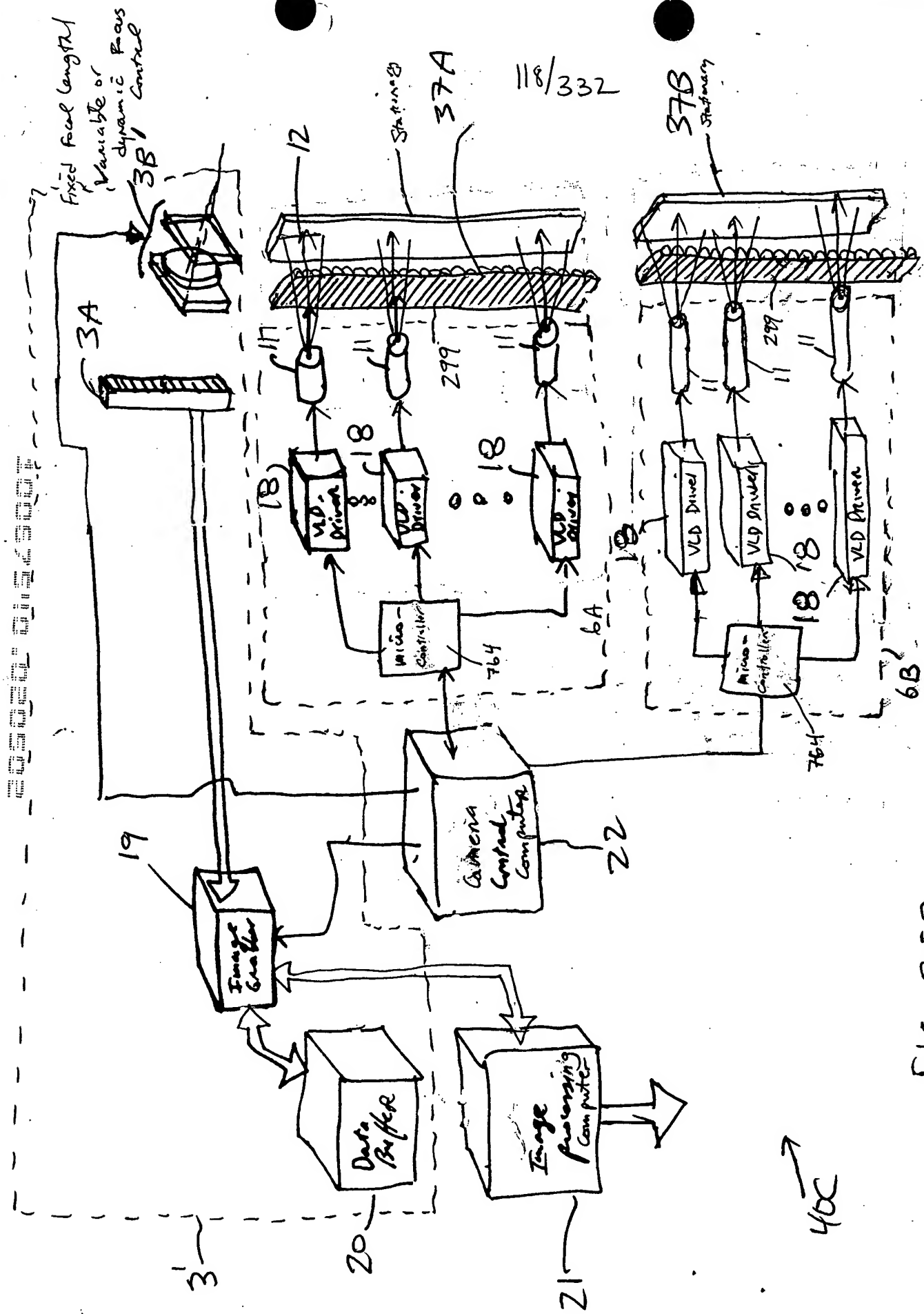


FIG. 2E1



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FIG. 2E2



203000 01525007

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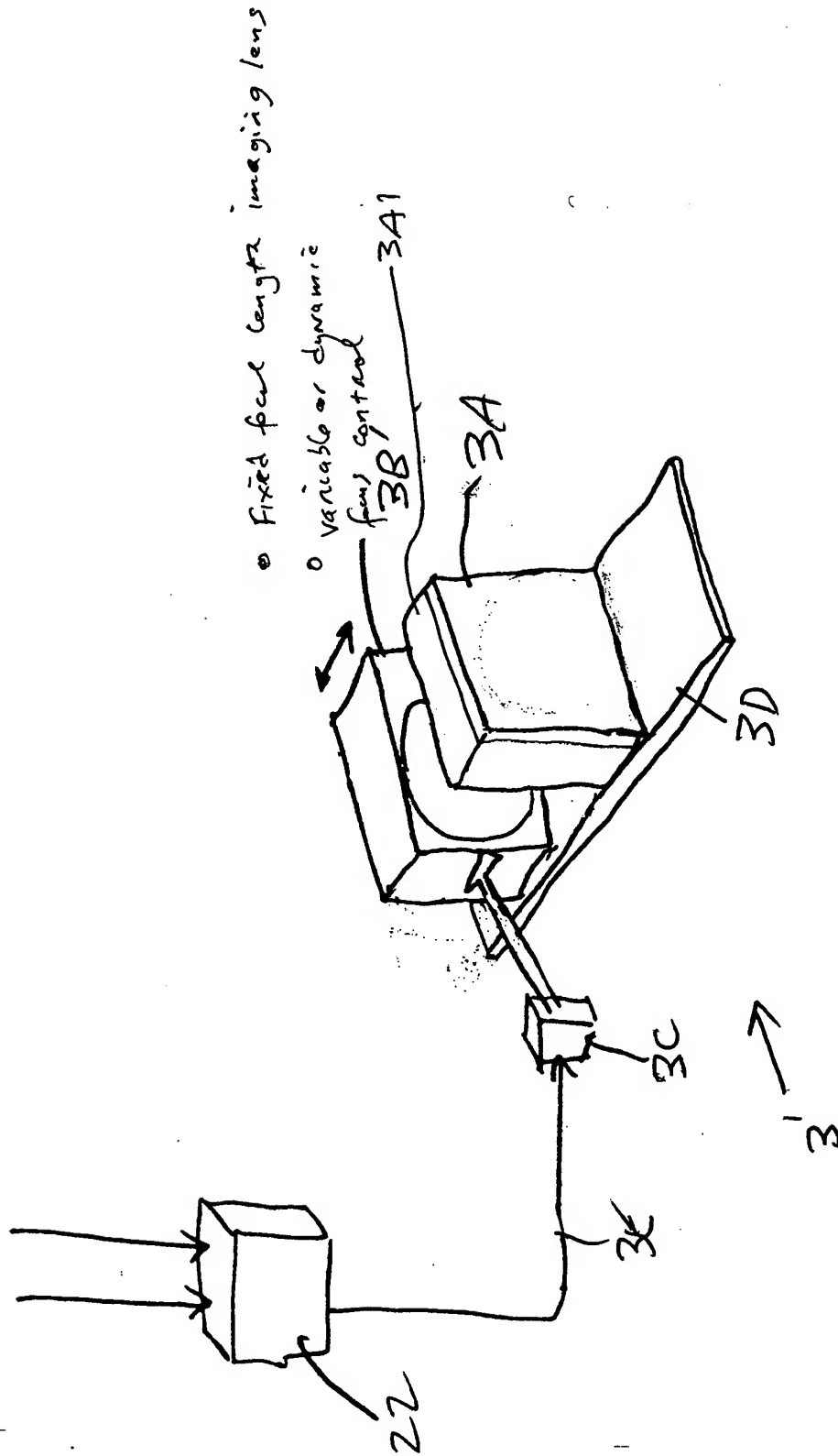


FIG. 2E3

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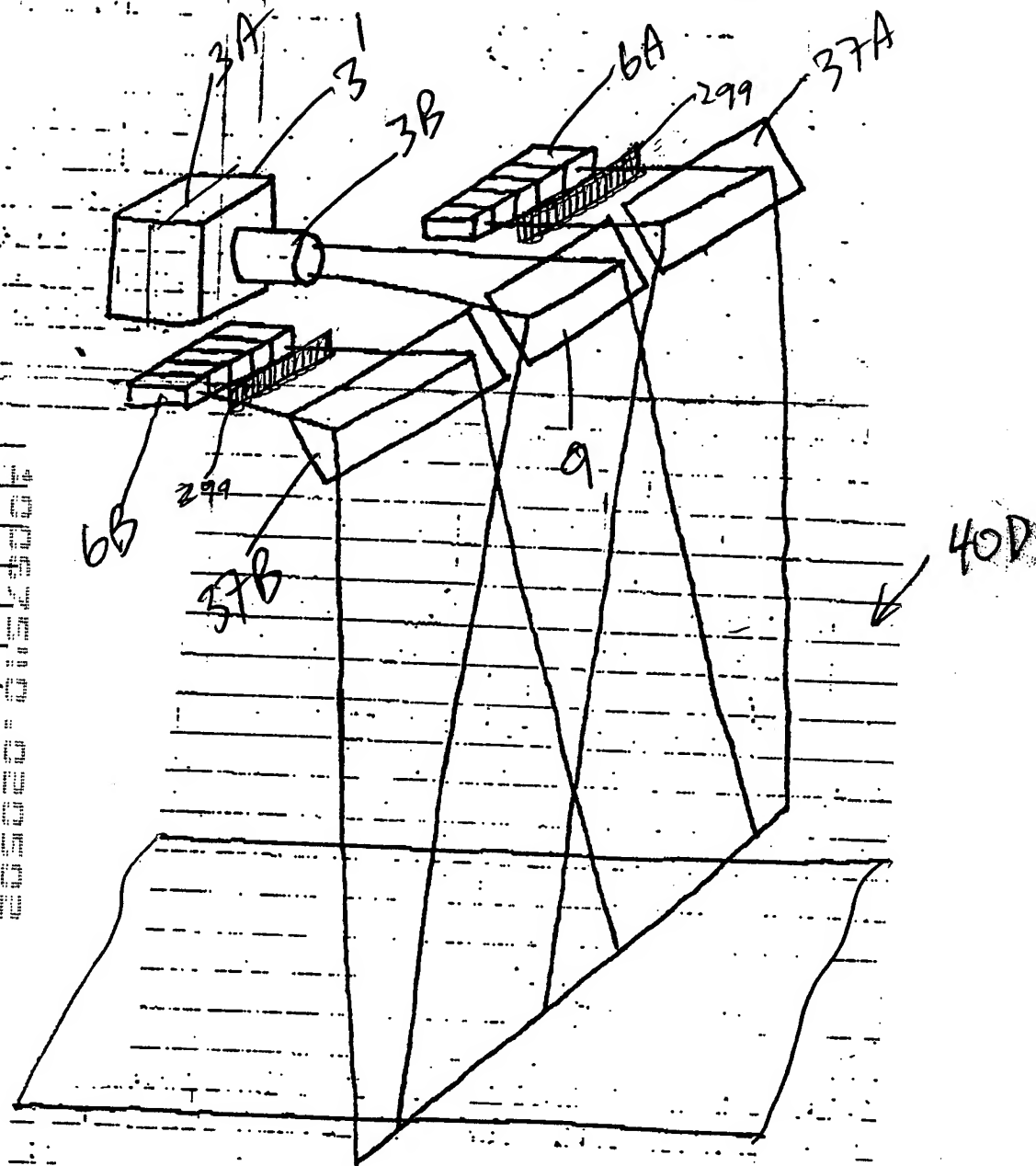


FIG. 2F1

FIG. 2F2

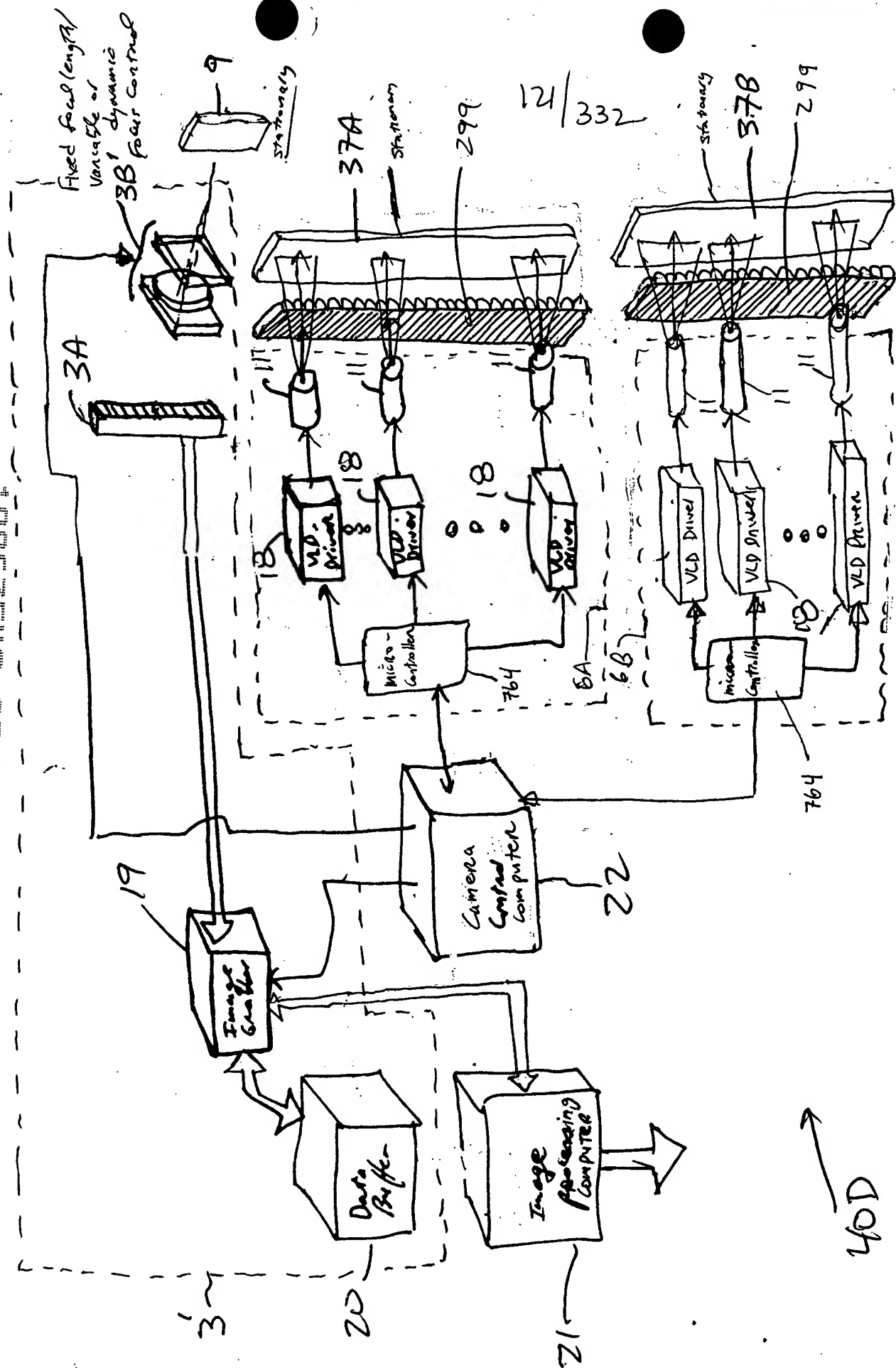


FIG. 2F2

- Fixed focal length imaging lens
- Variable focus or dynamic focus contrast

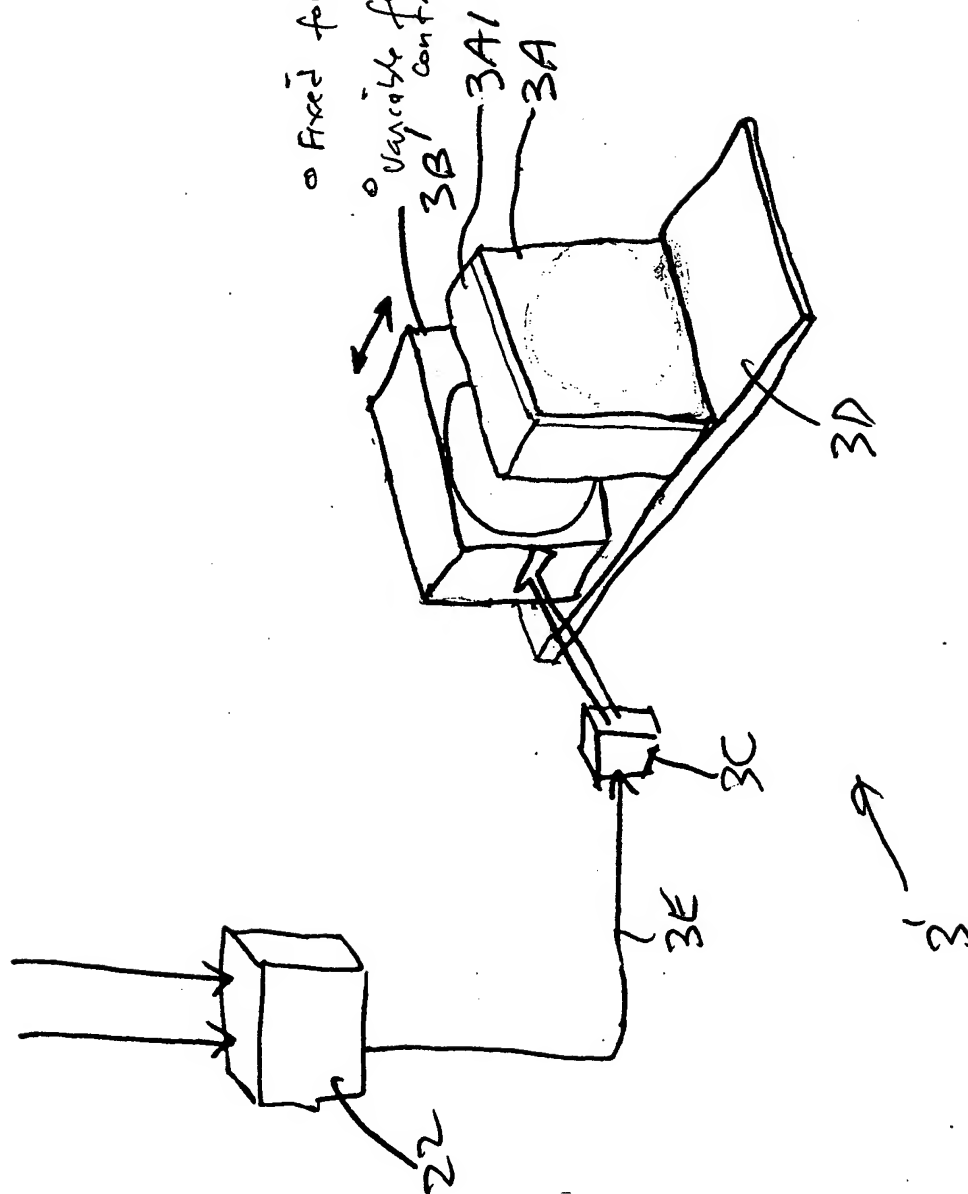


FIG. 2F3

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Top Conveyor Scanner:

- fixed focal length imaging lens
- variable focal distance control

Side Conveyor Scanner:

- fixed focal length imaging lens
- dynamic focal distance control

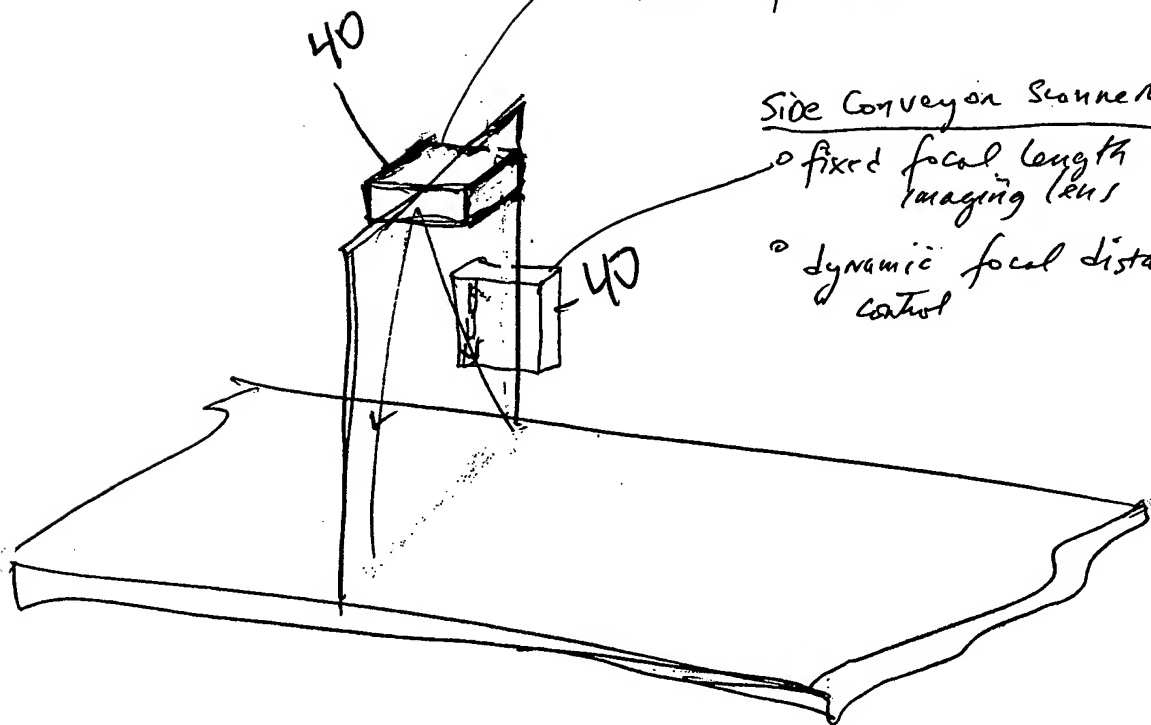


FIG. 2G

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Composite Plane of Laser Illumination

FOV

12

18

19

20

21

22

29A

29B

3A

3B

37A

37B

6A

6B

1B

40C

FIG. 2H

Applications:
 • Hand Held Scanner
 • Presentation Scanner

FIG. 2H

- Applications:
- Hand held scanner
- Presentation Scanner

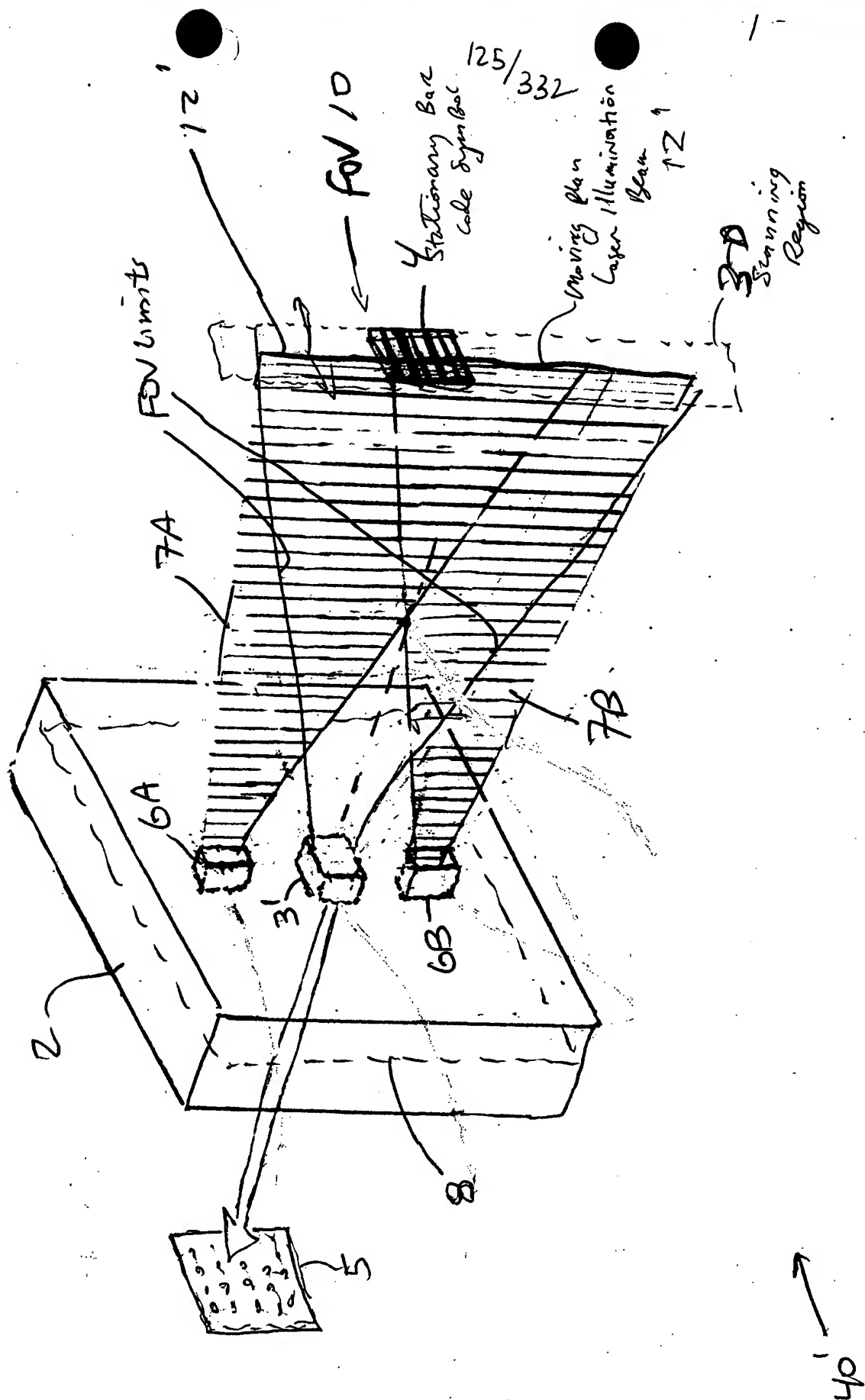
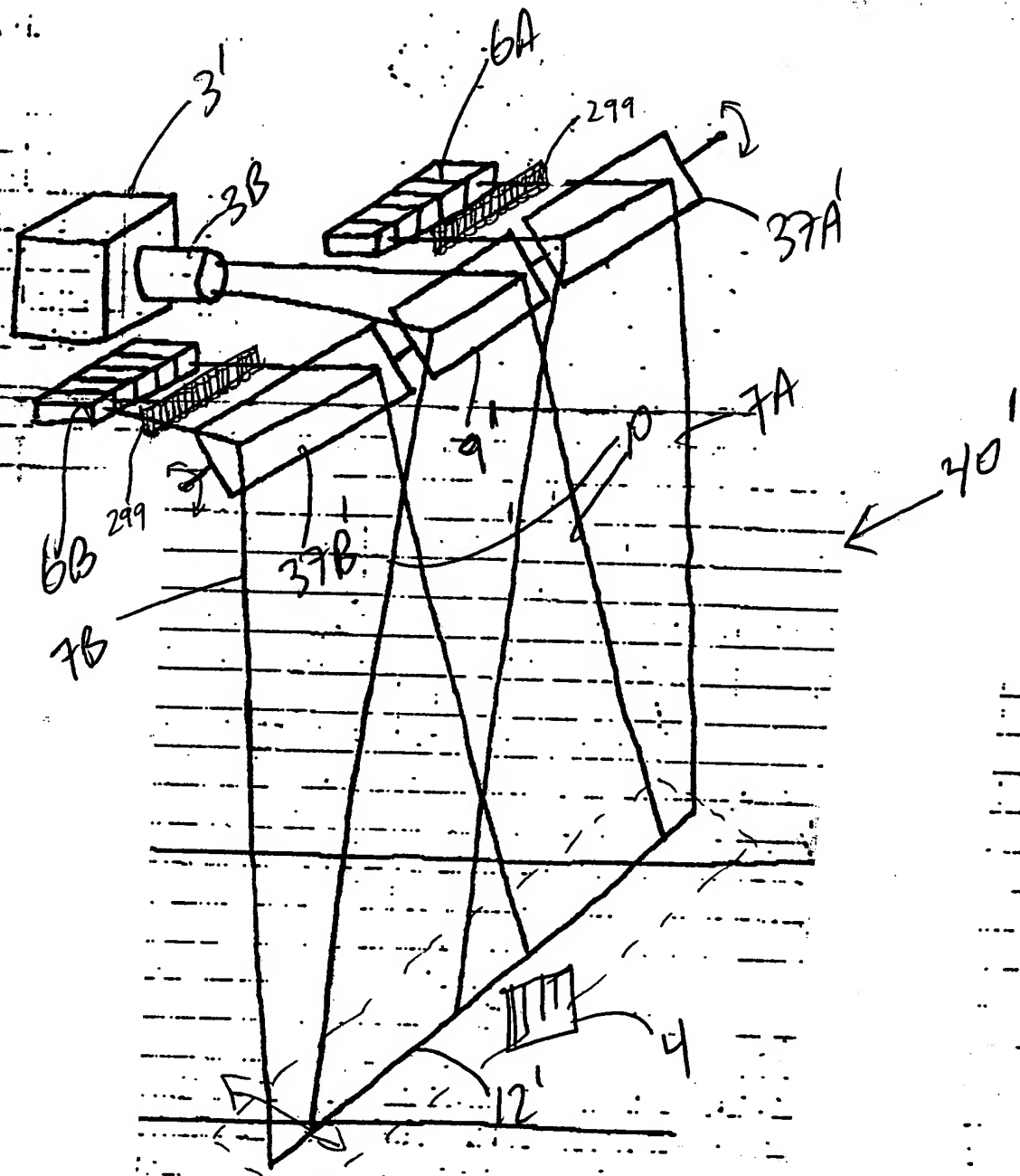
[illegible]

FIG. 211

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3-D
Scanning
Region

FIG 2I2

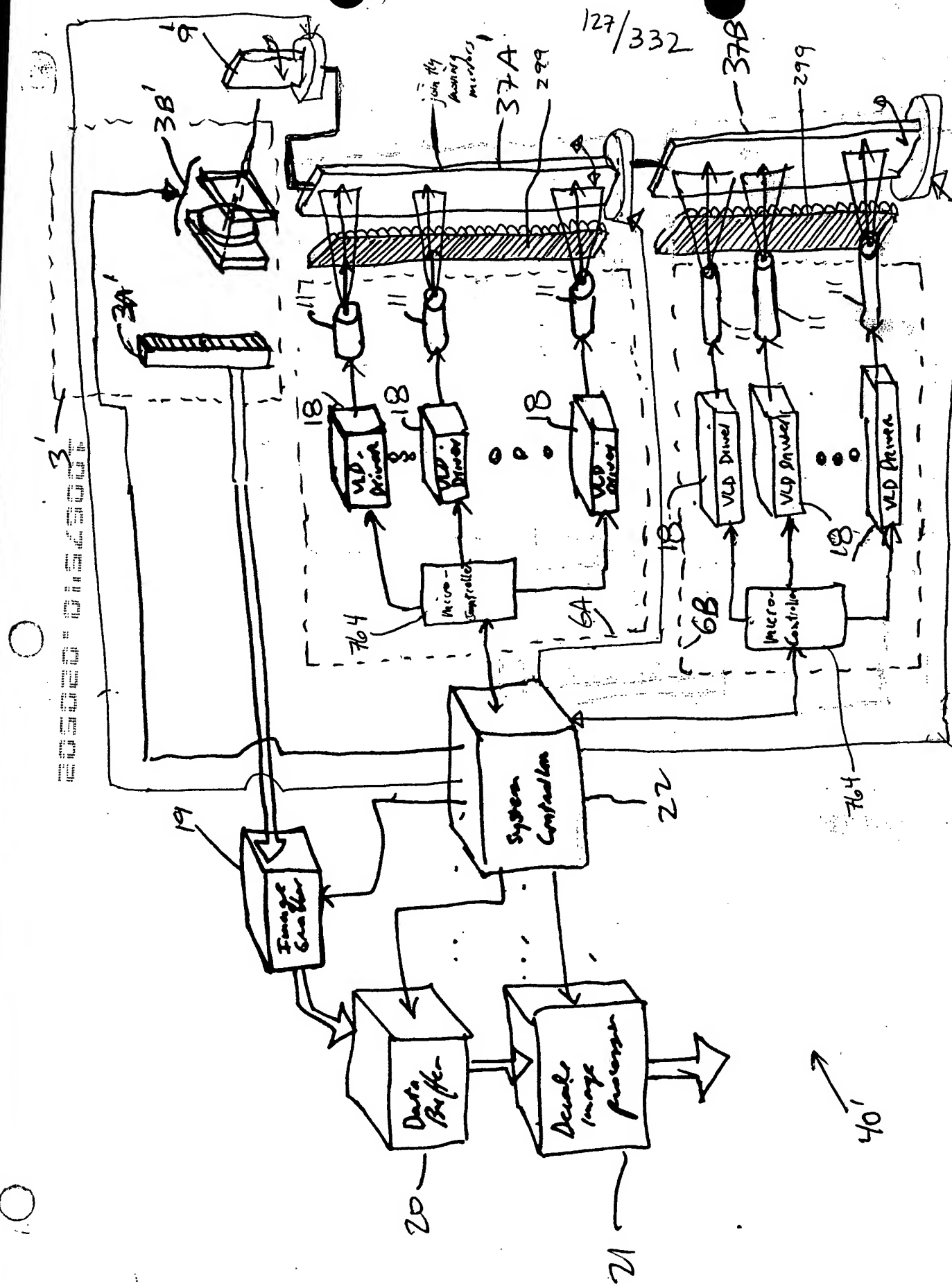


FIG. 213

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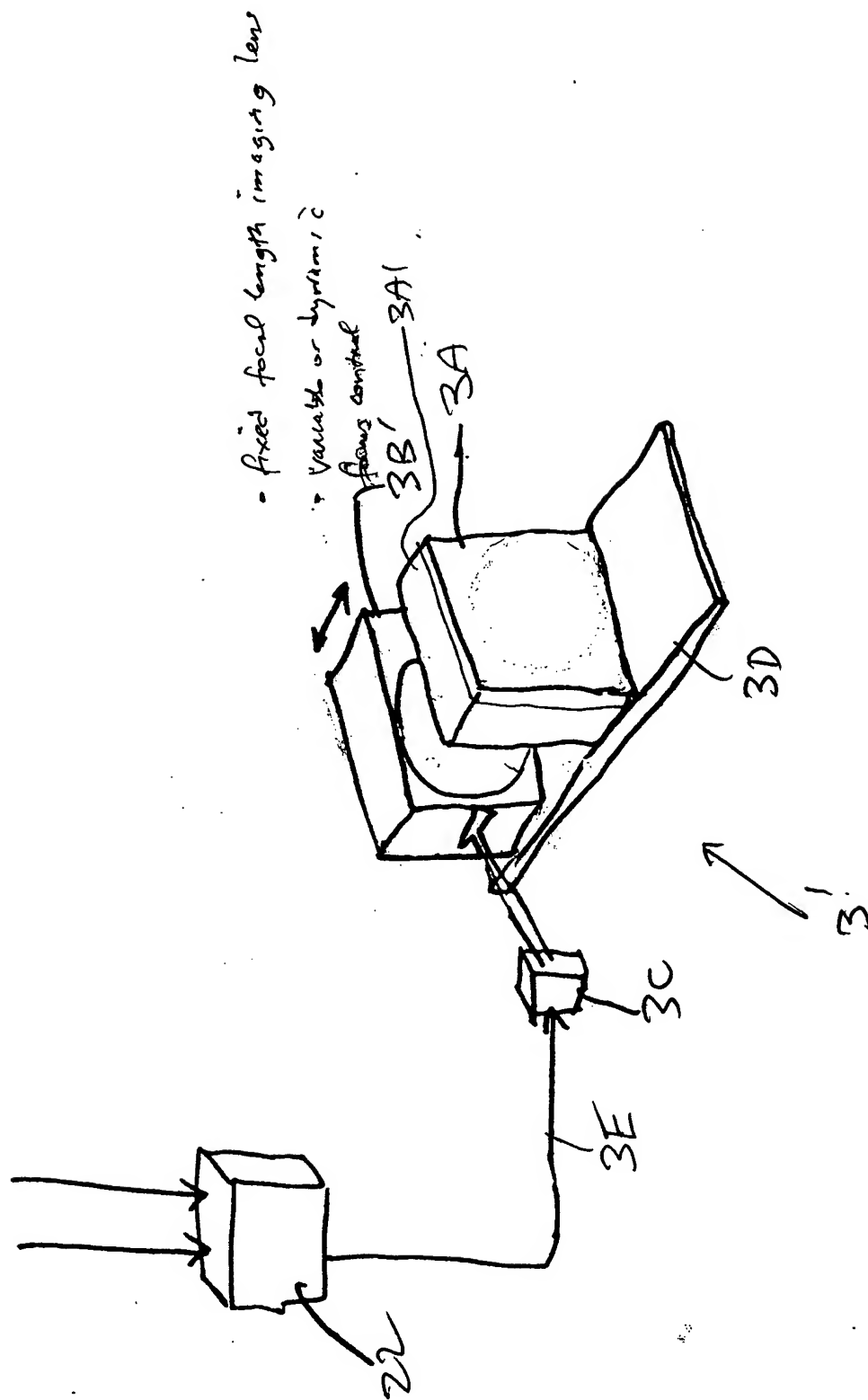


FIG. 2I4

203000 012300T

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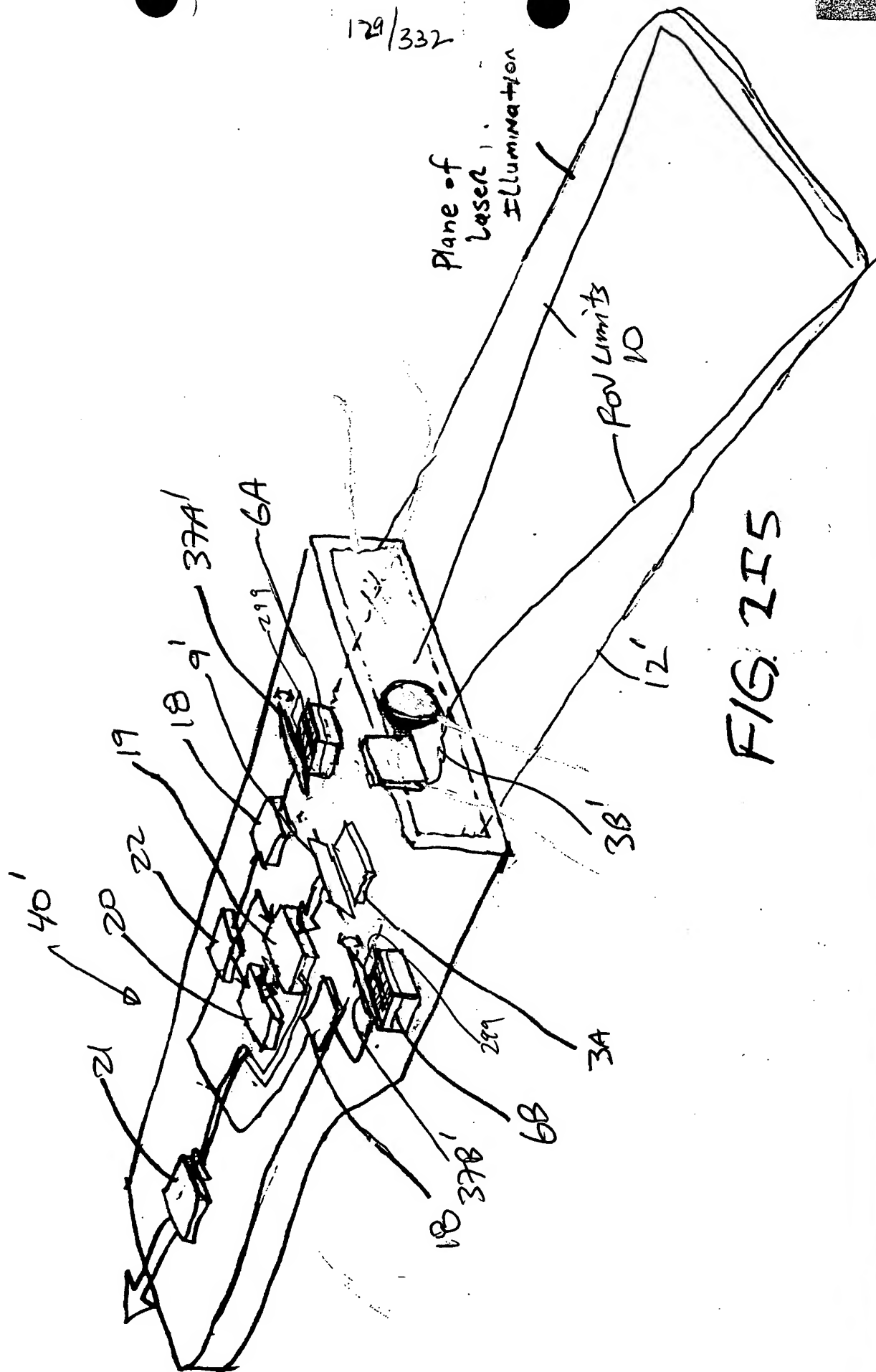
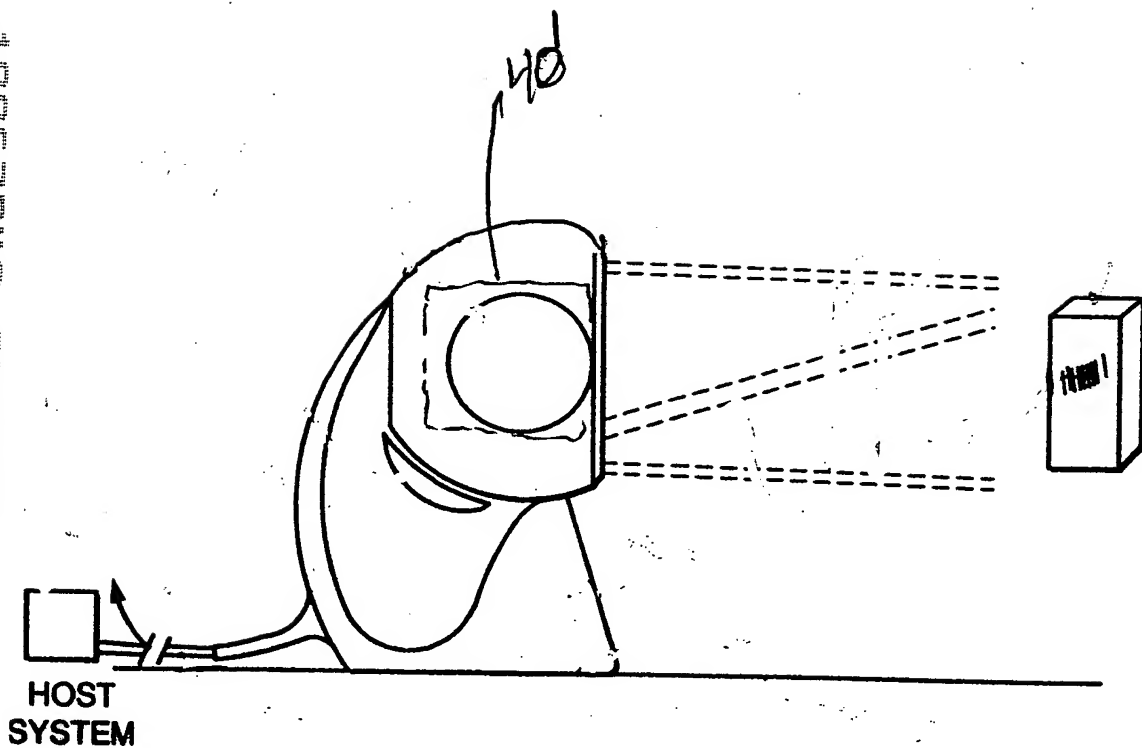


FIG. 215



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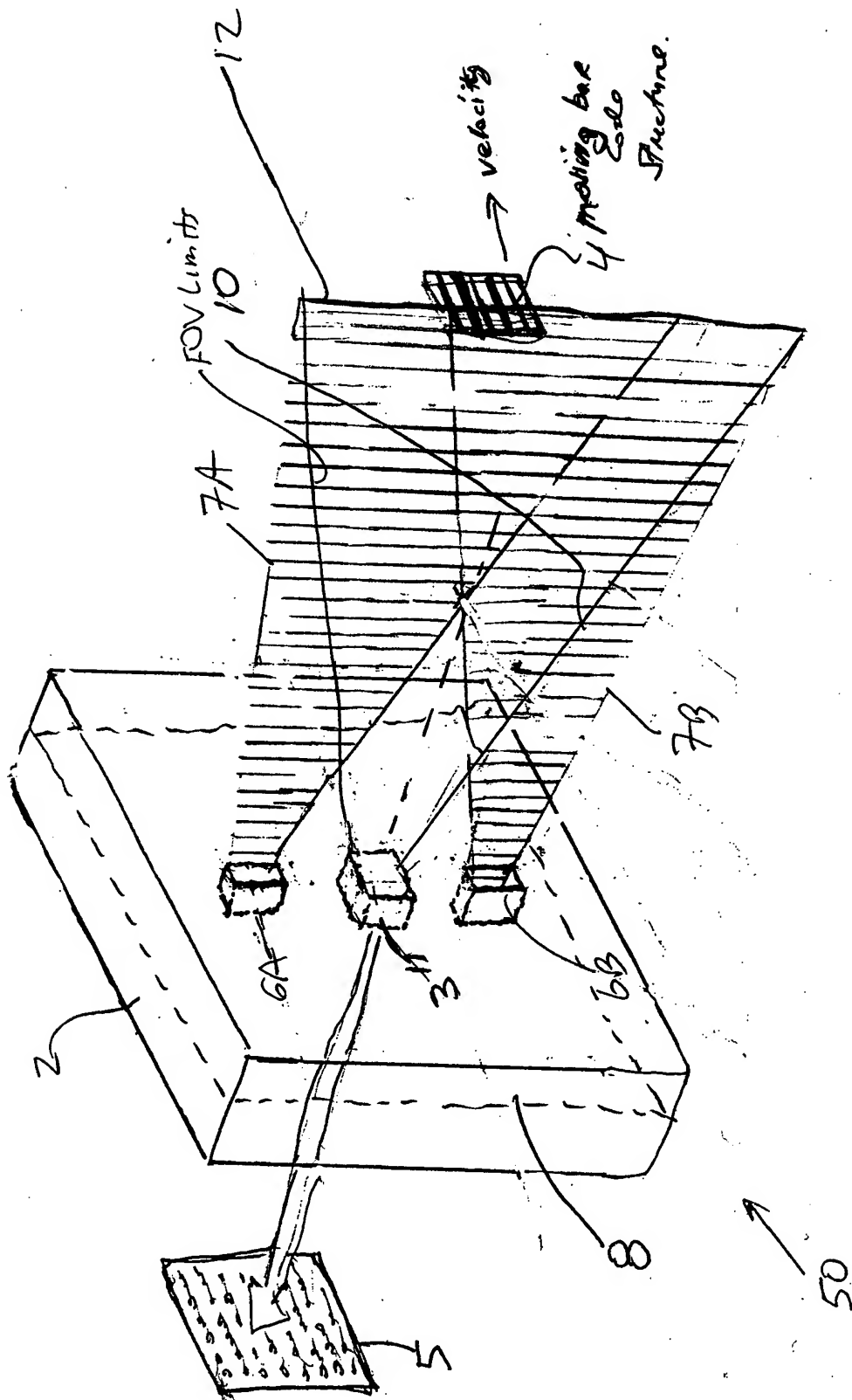
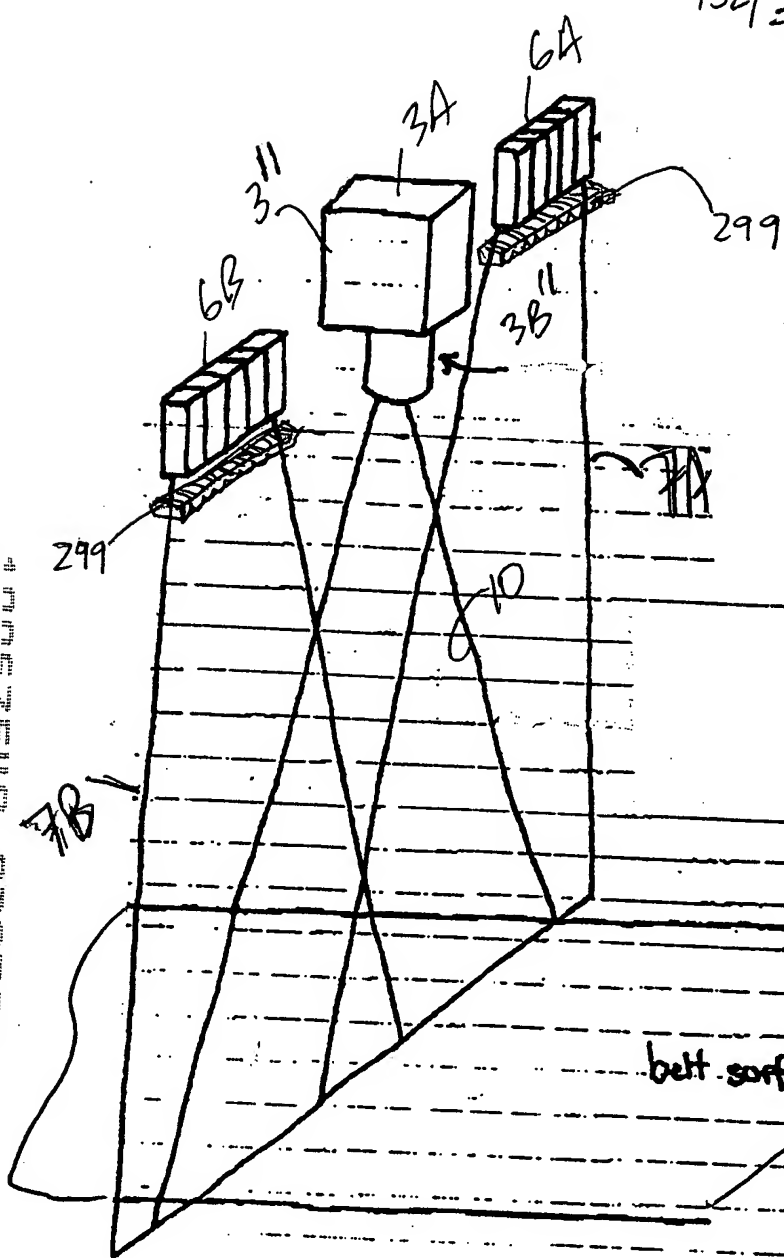


FIG 3A

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50A

FIG. 3B1

(The page contains faint, illegible markings and a large dark smudge.)

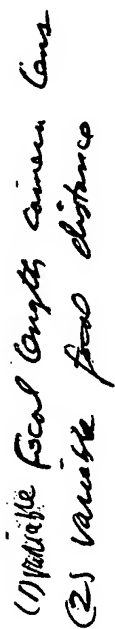


Fig. 382

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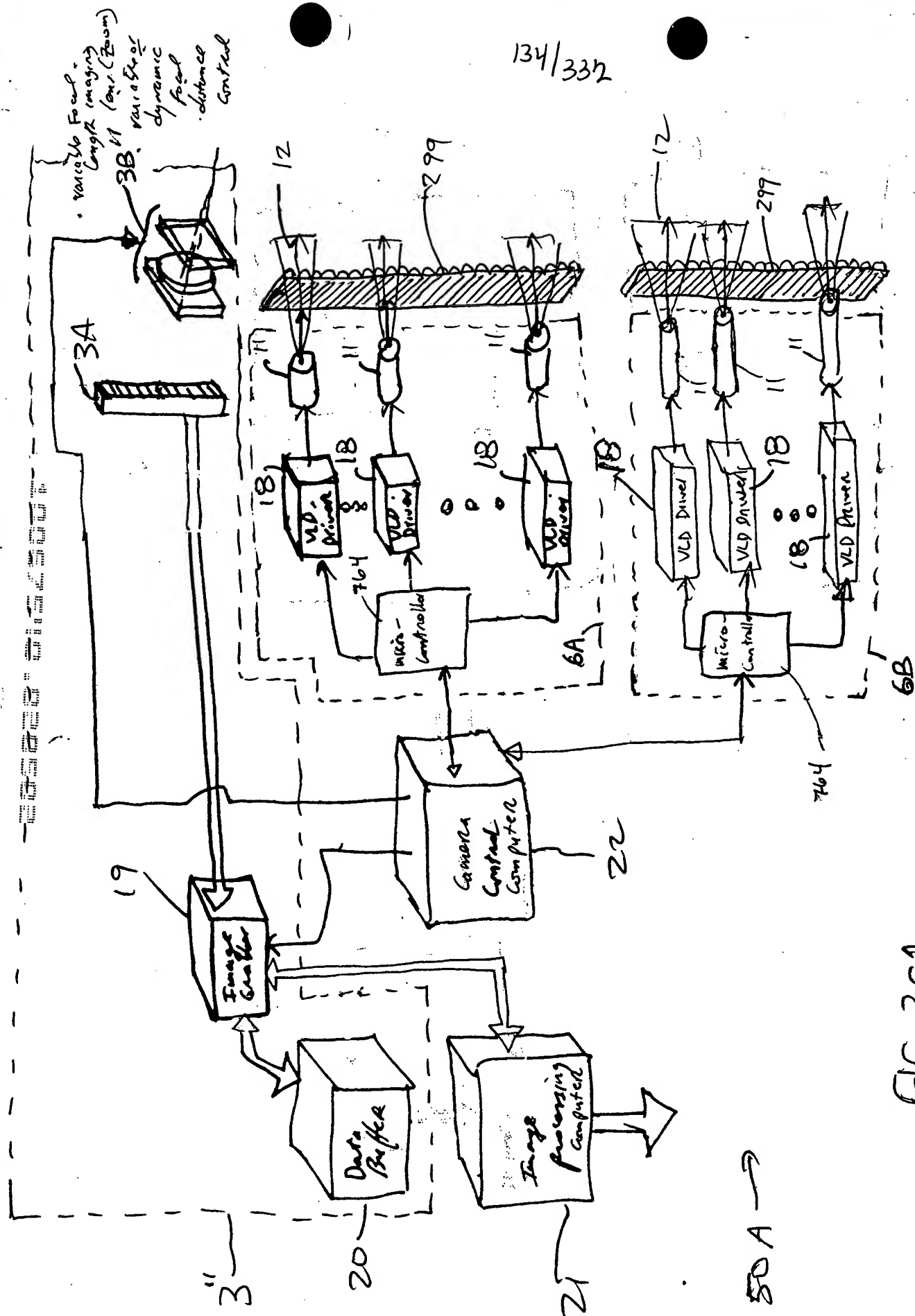
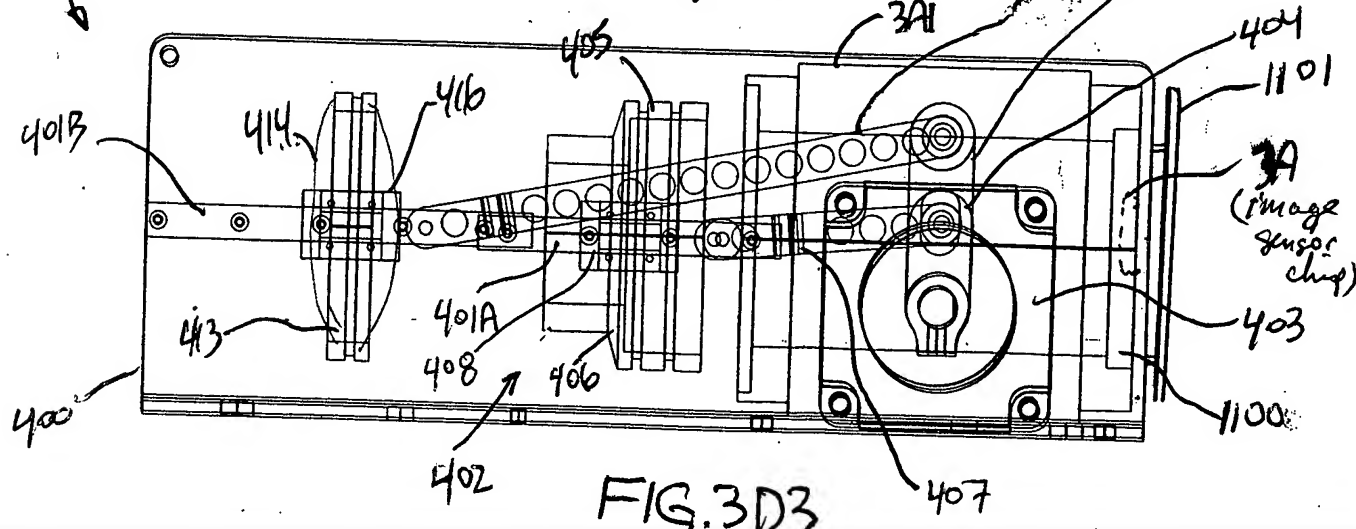
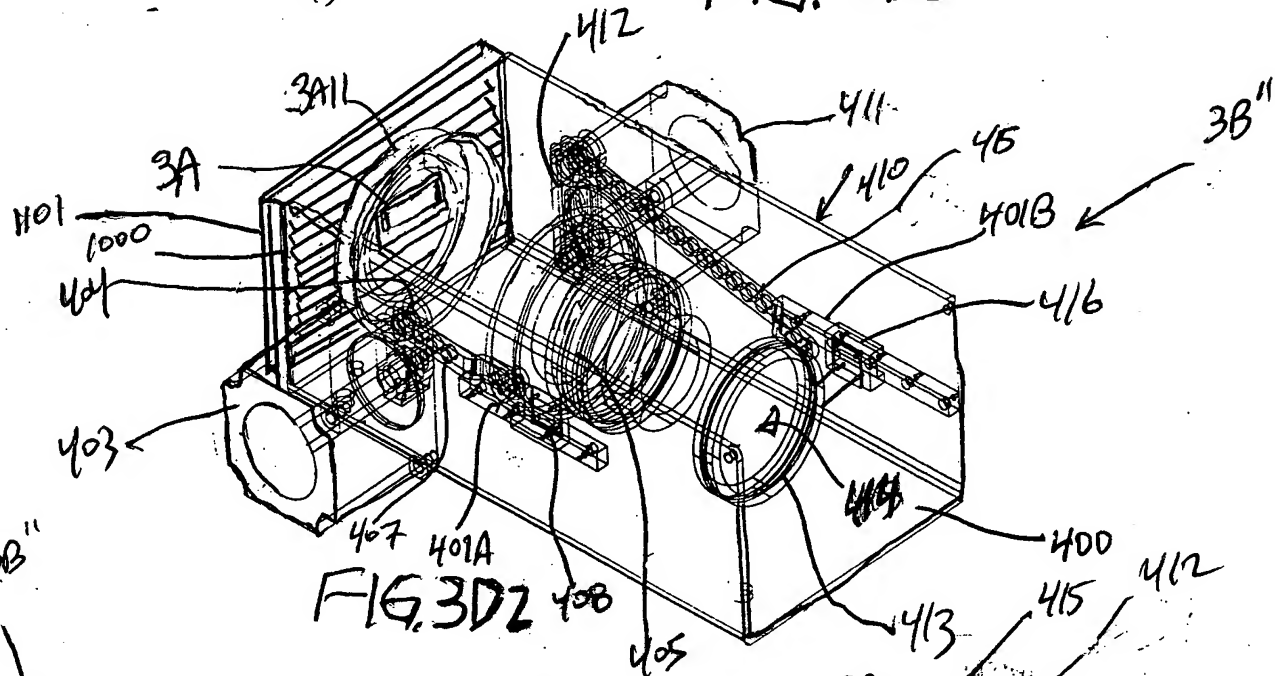
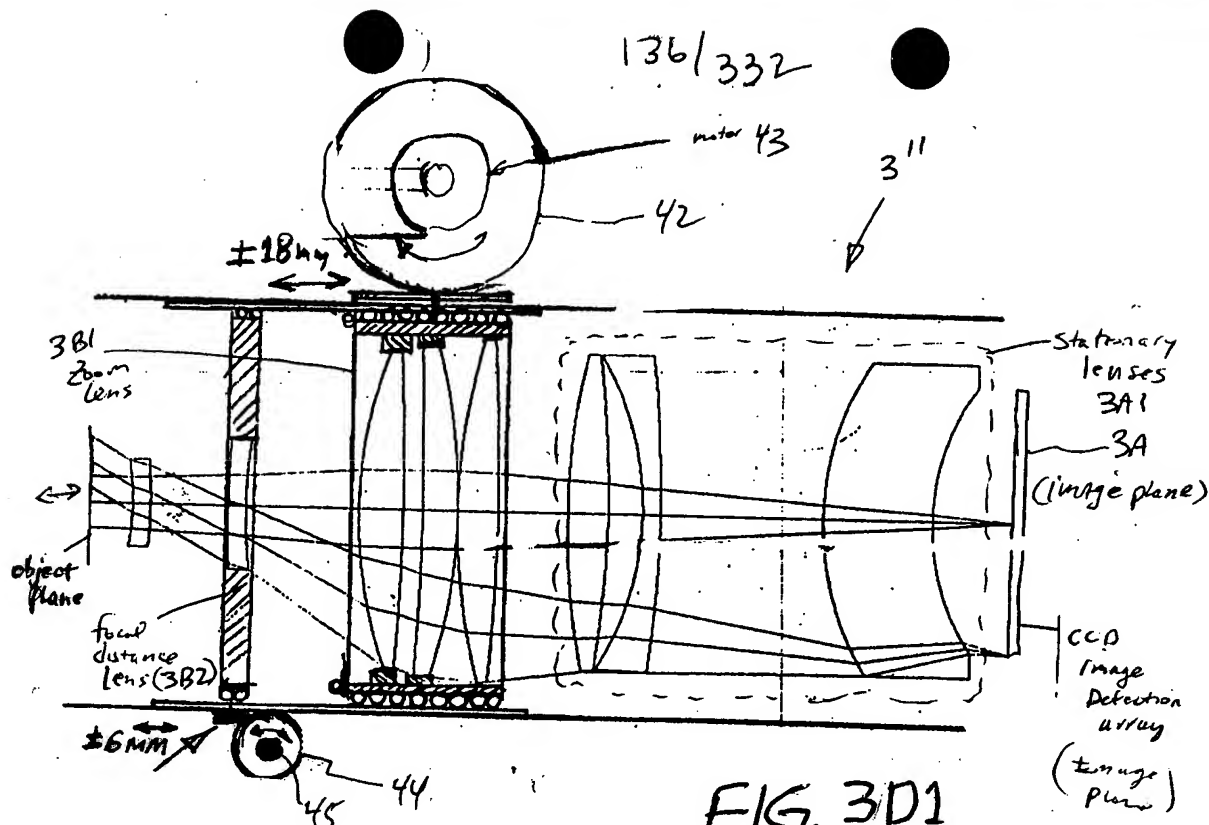
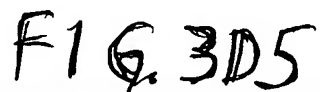
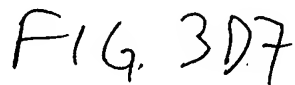
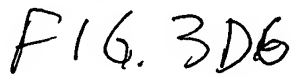


FIG 3C1



[illegible]



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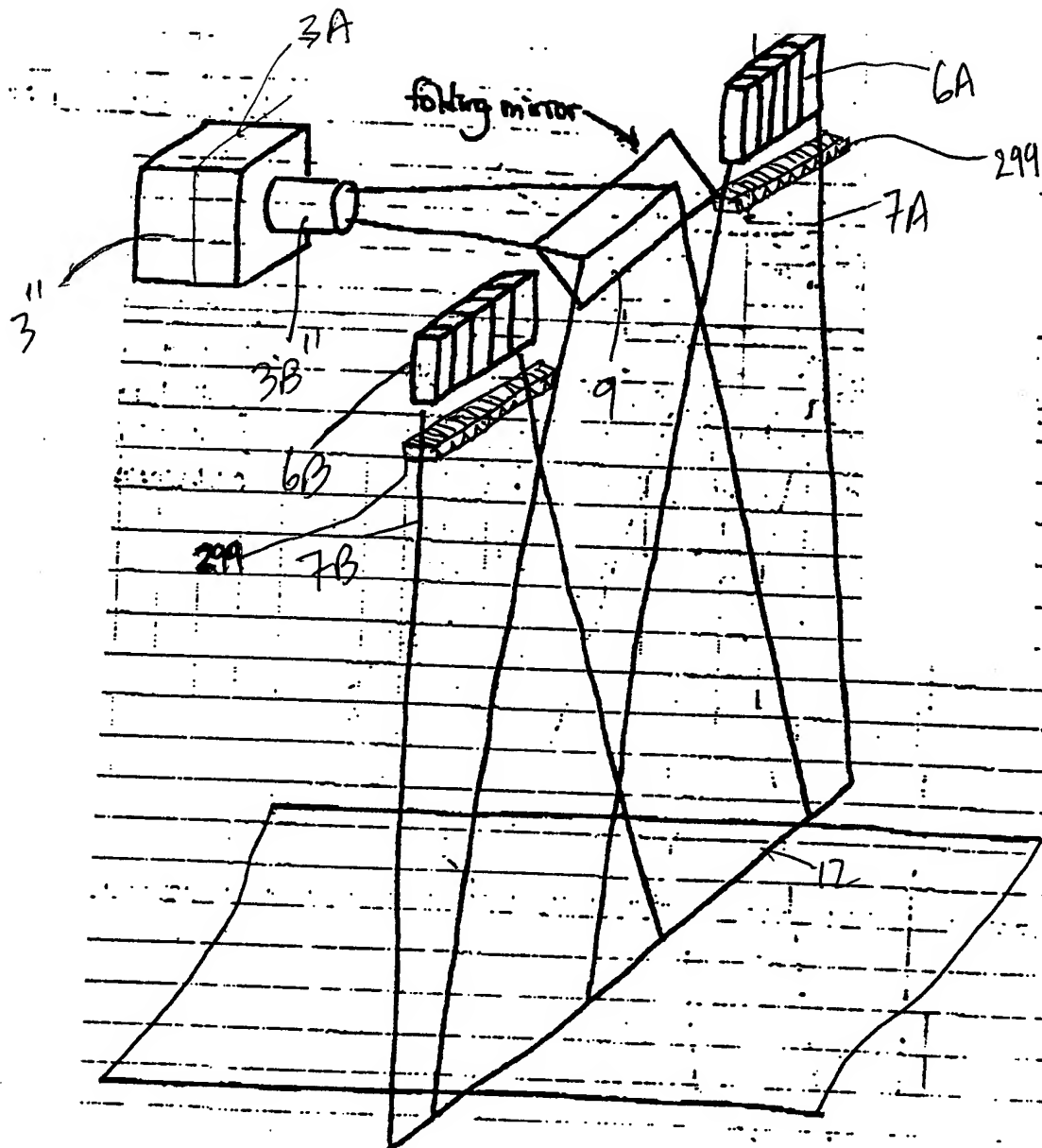
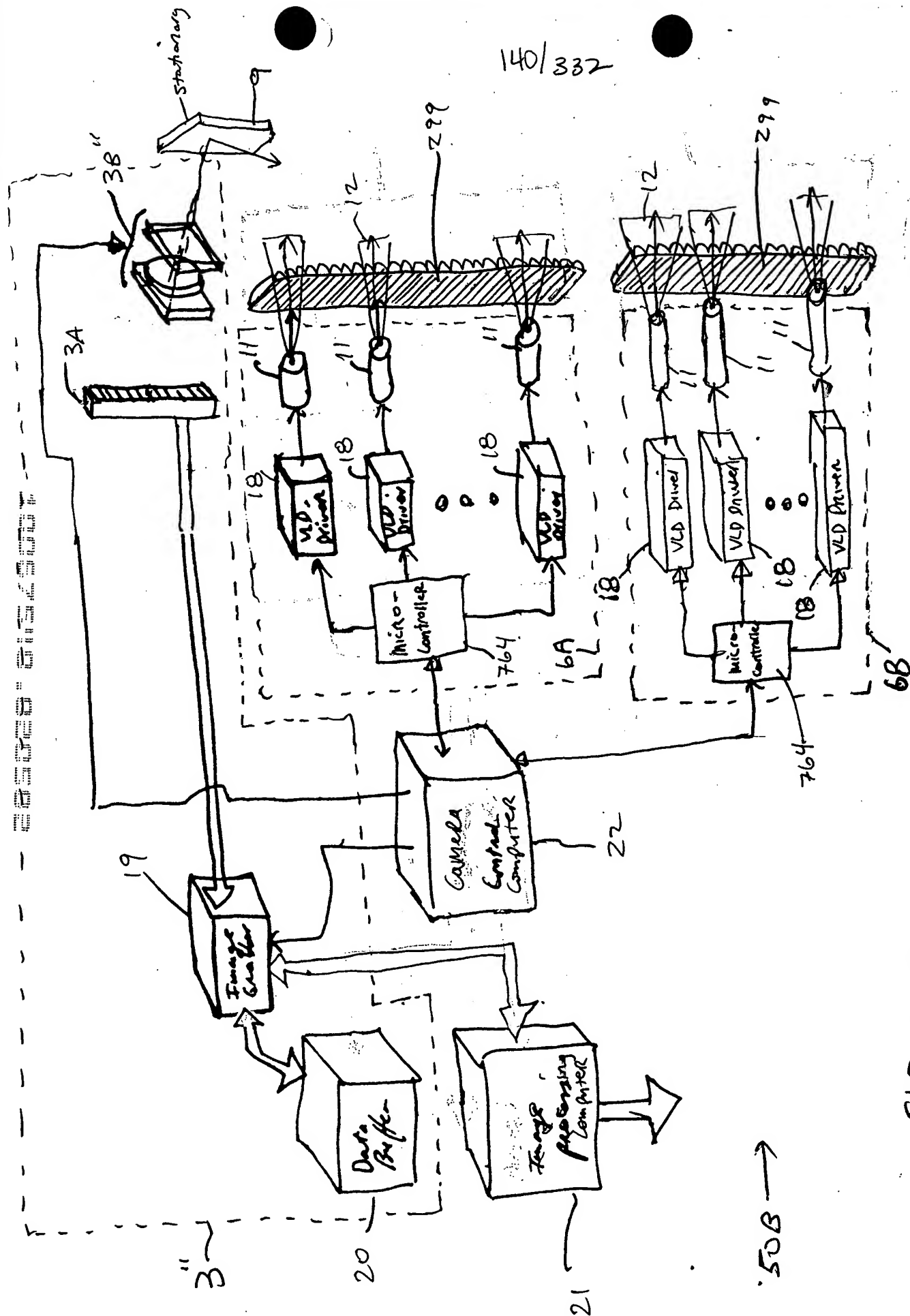


FIG. 3E1

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223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

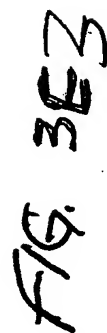


FIG. 3E3

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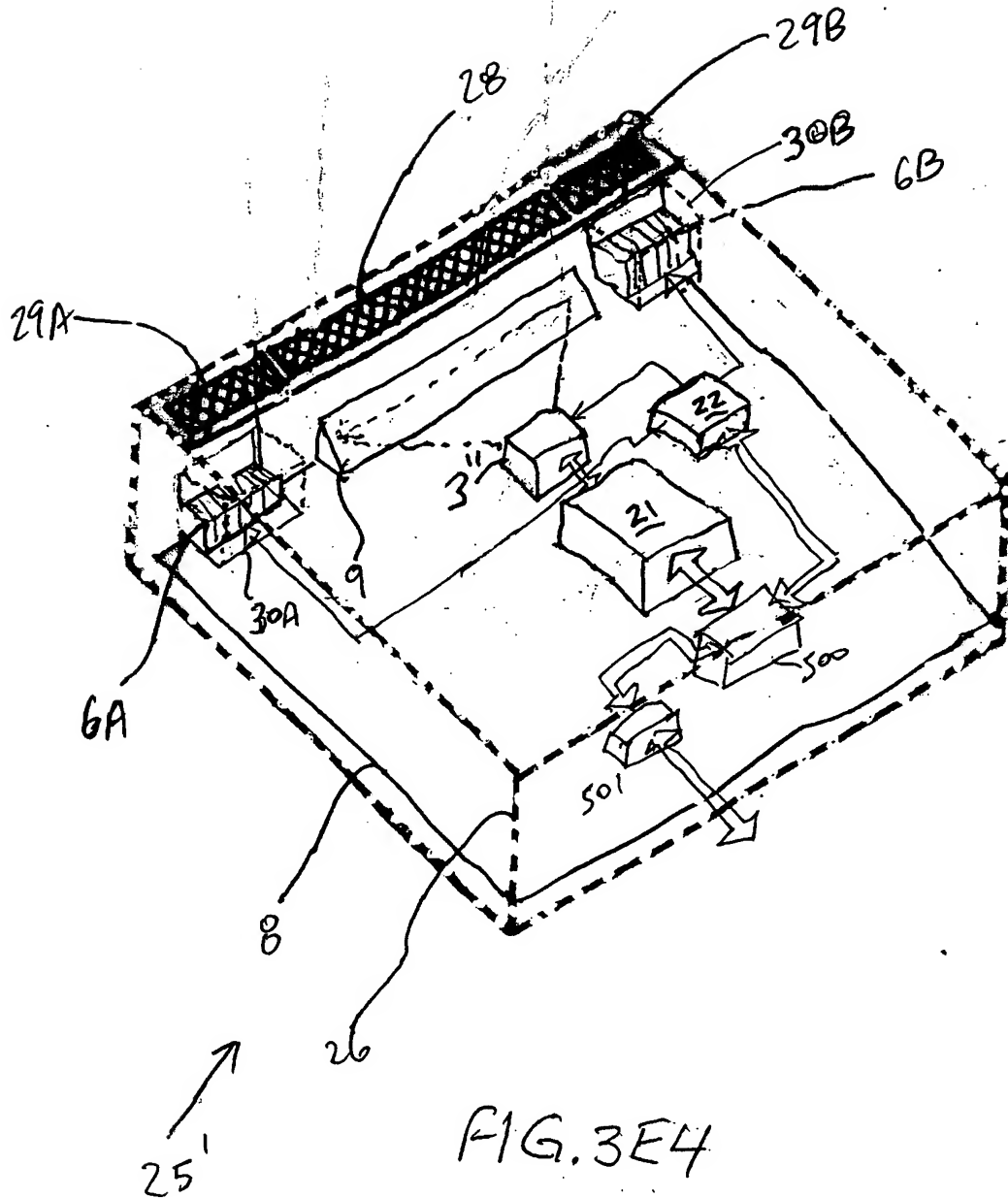


FIG. 3E4

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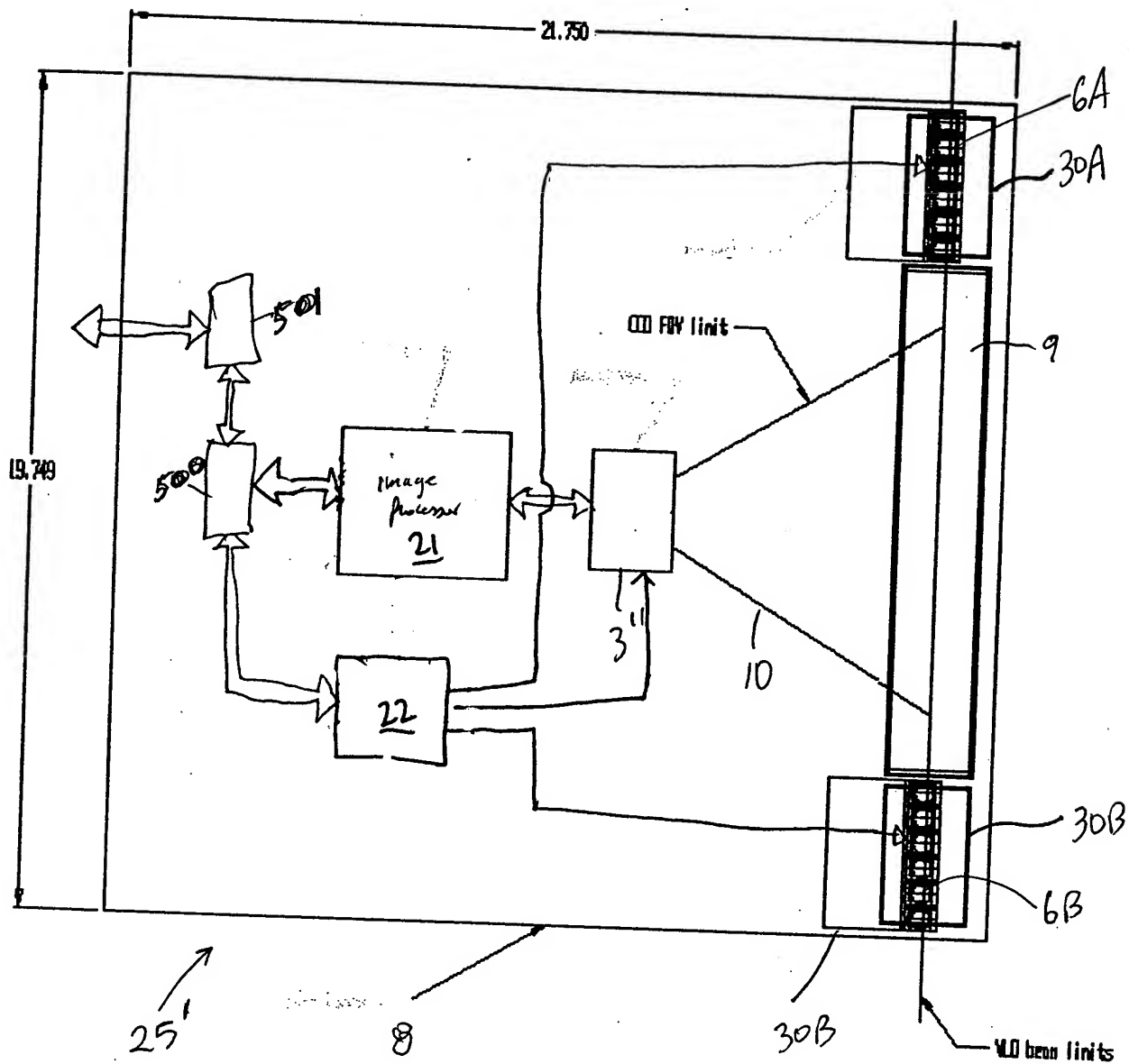


FIG. 3E5

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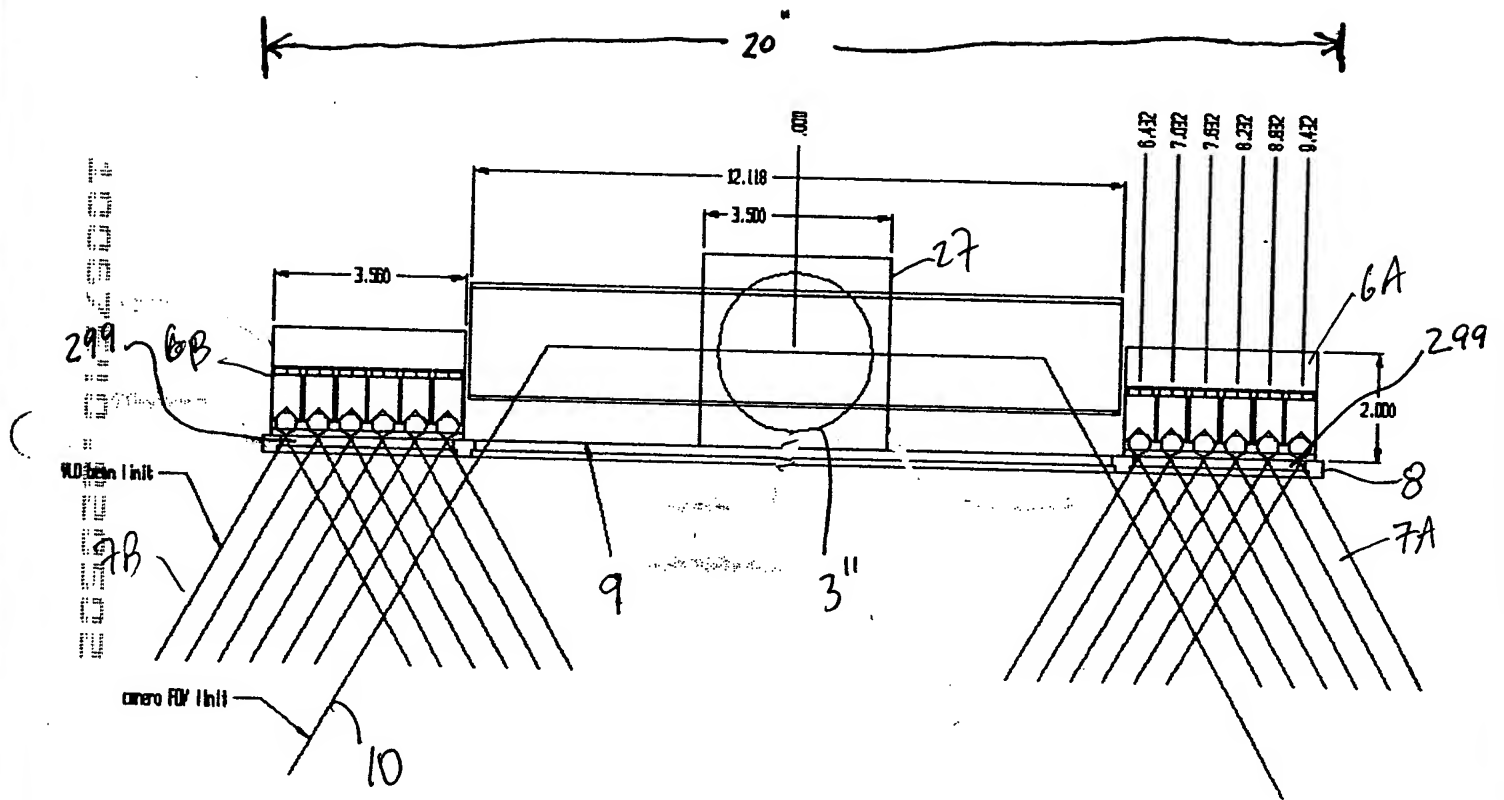


FIG. 3E6

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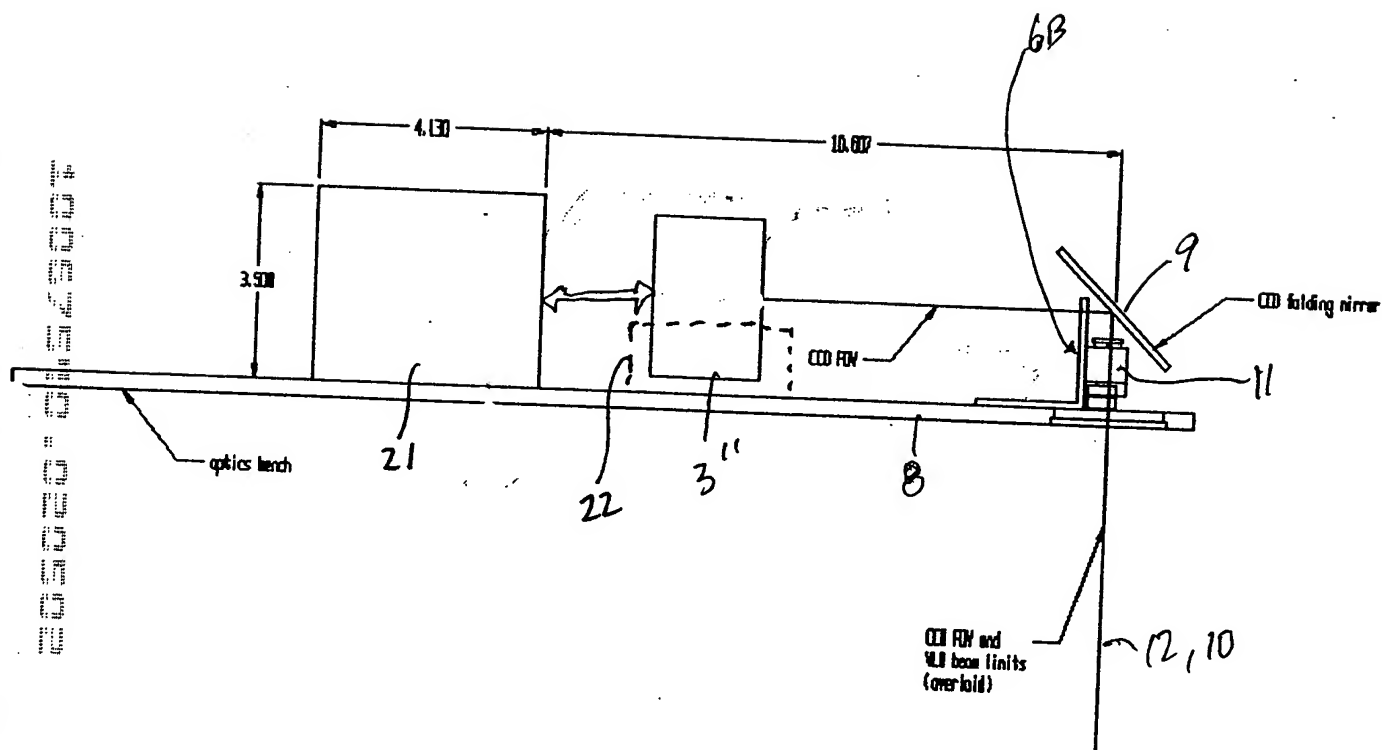


FIG. 3E7

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★ Variable FOV

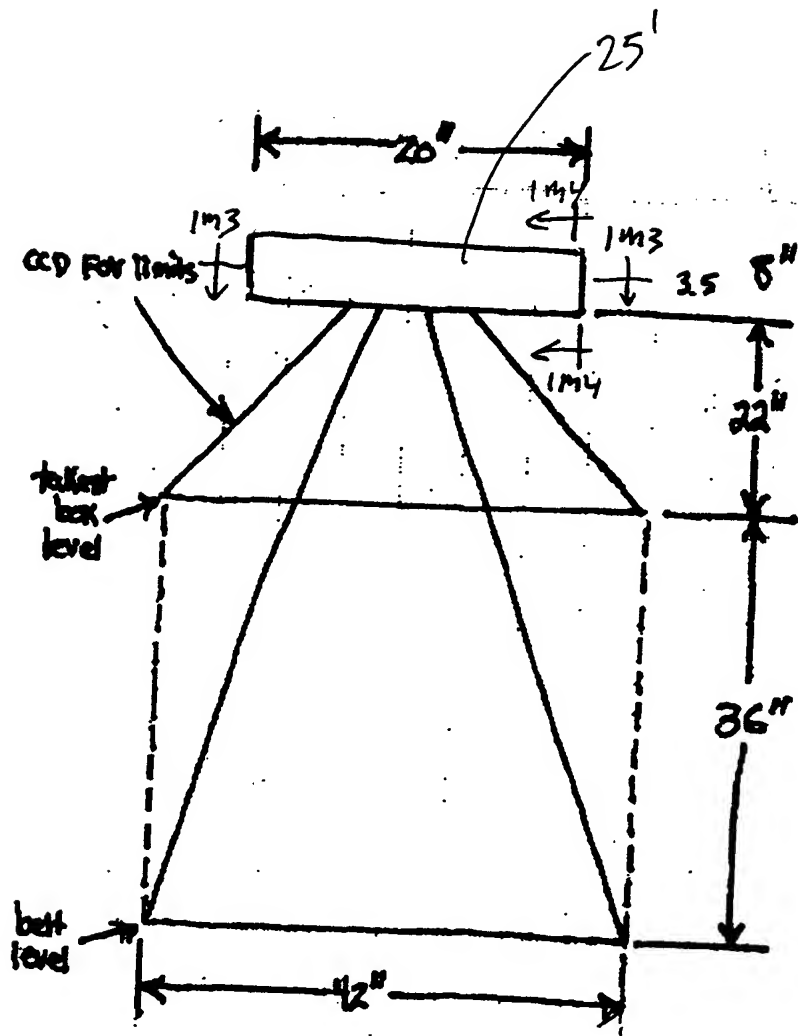


FIG. 3E8

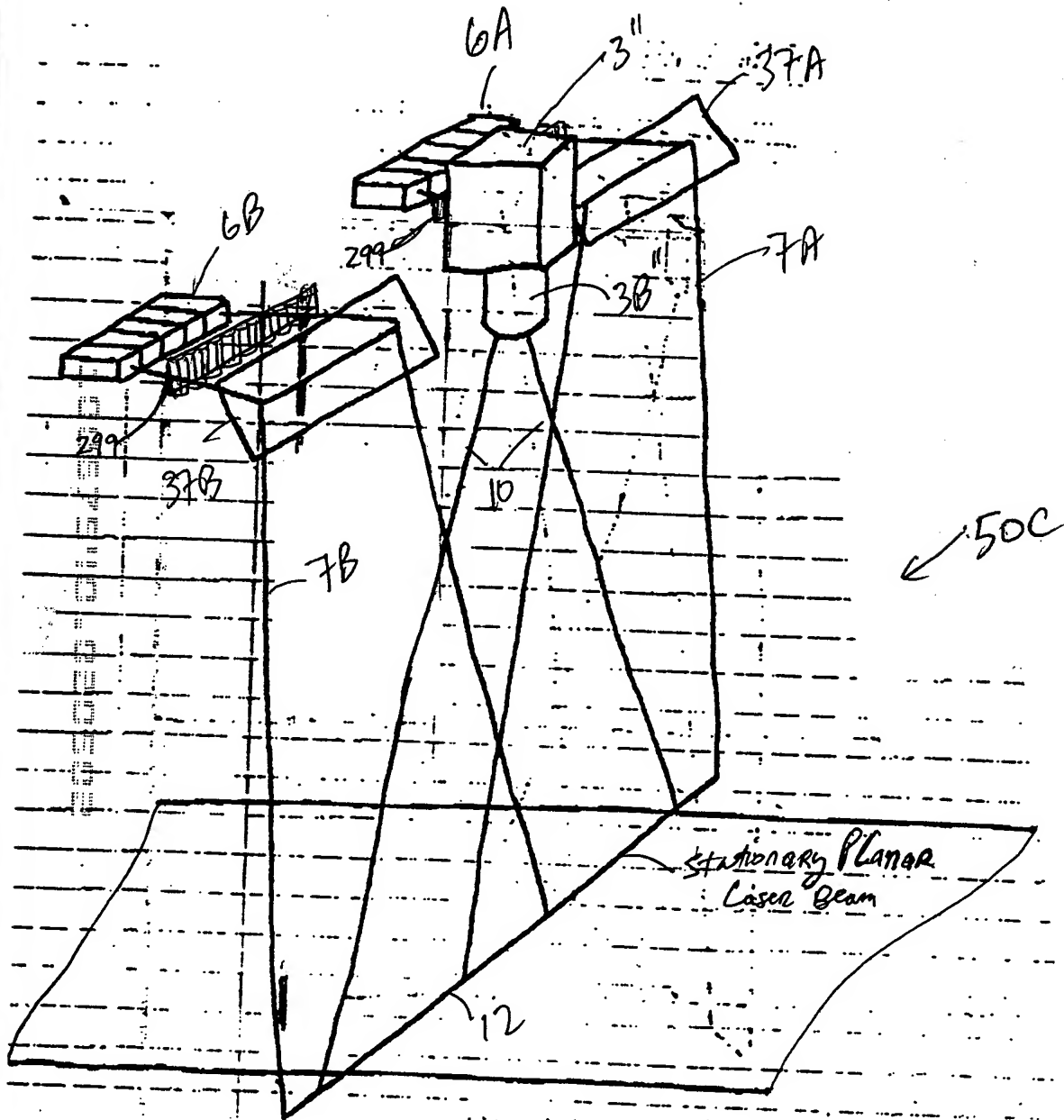
$$147/332$$


FIG. 3F1

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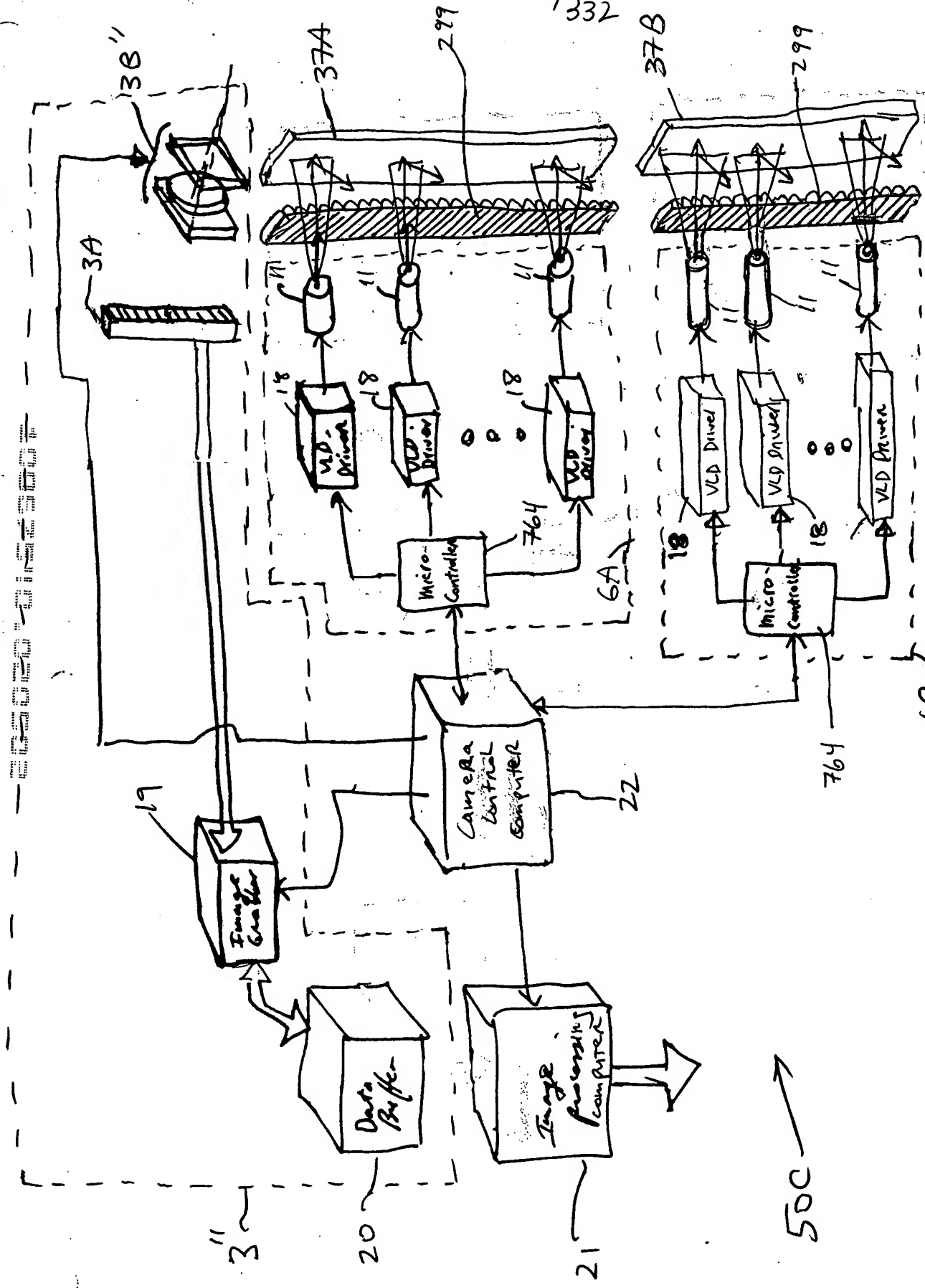


FIG. 3F2

500 →

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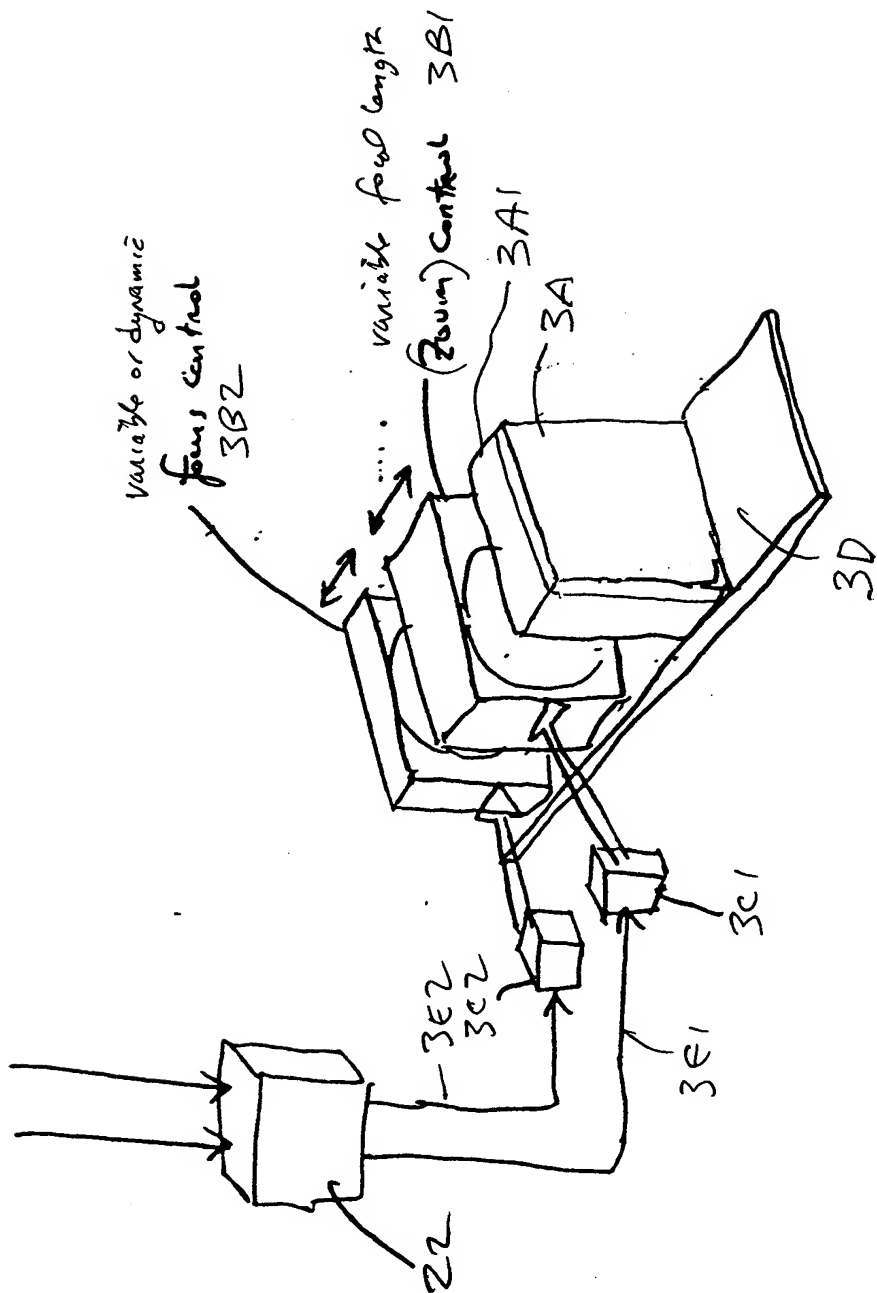


FIG. 3F3

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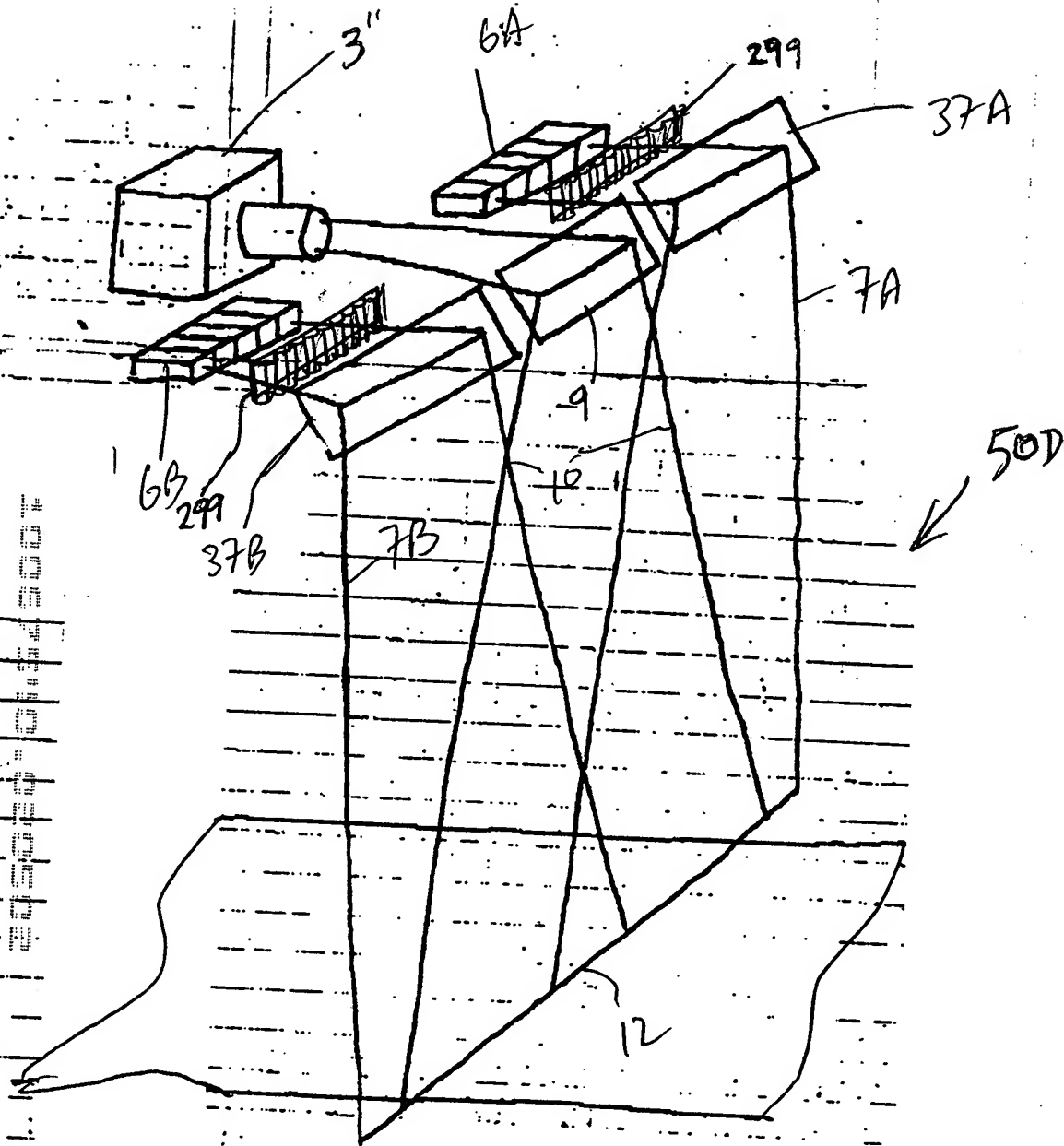


FIG. 3G1

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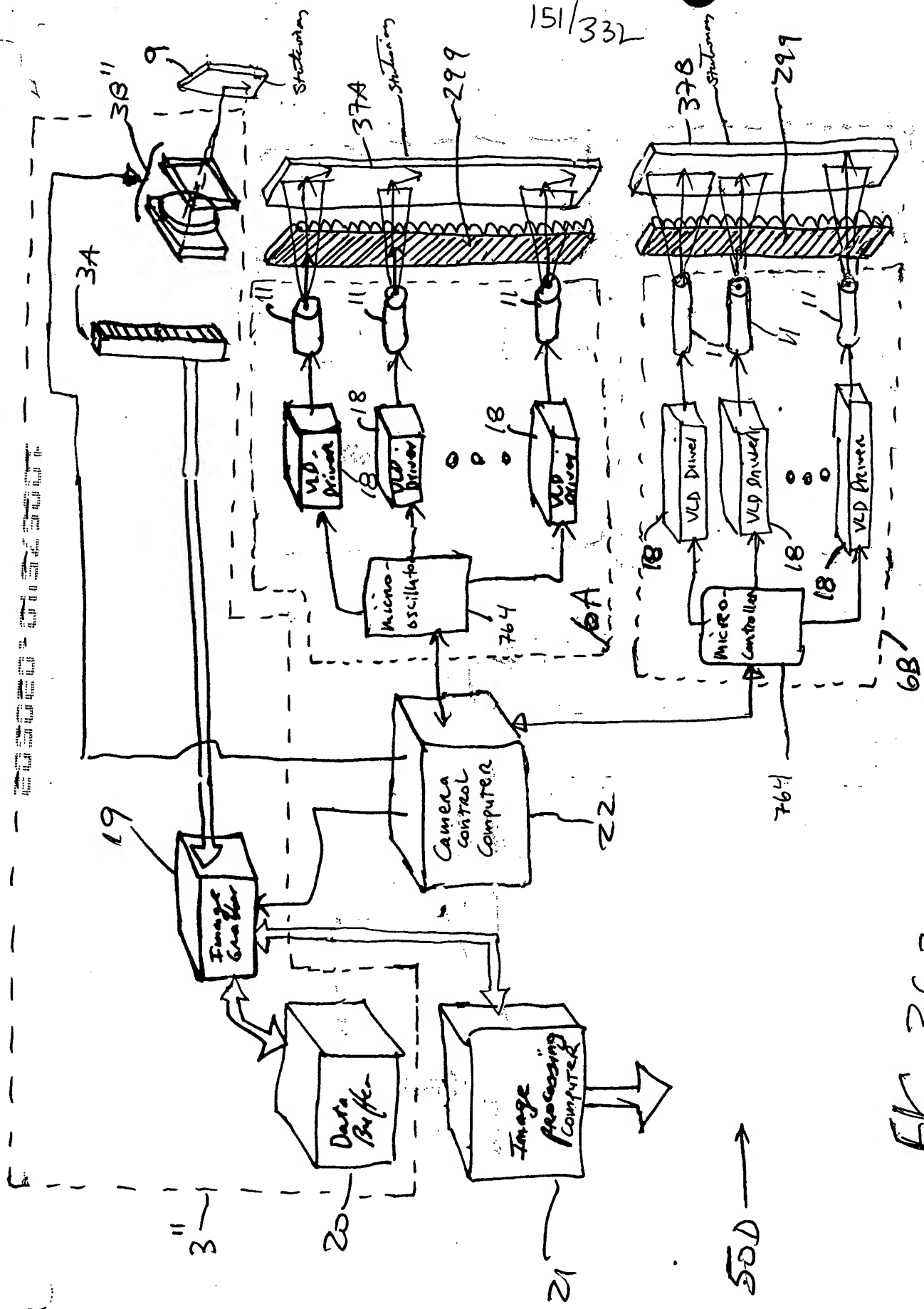


FIG. 3G2

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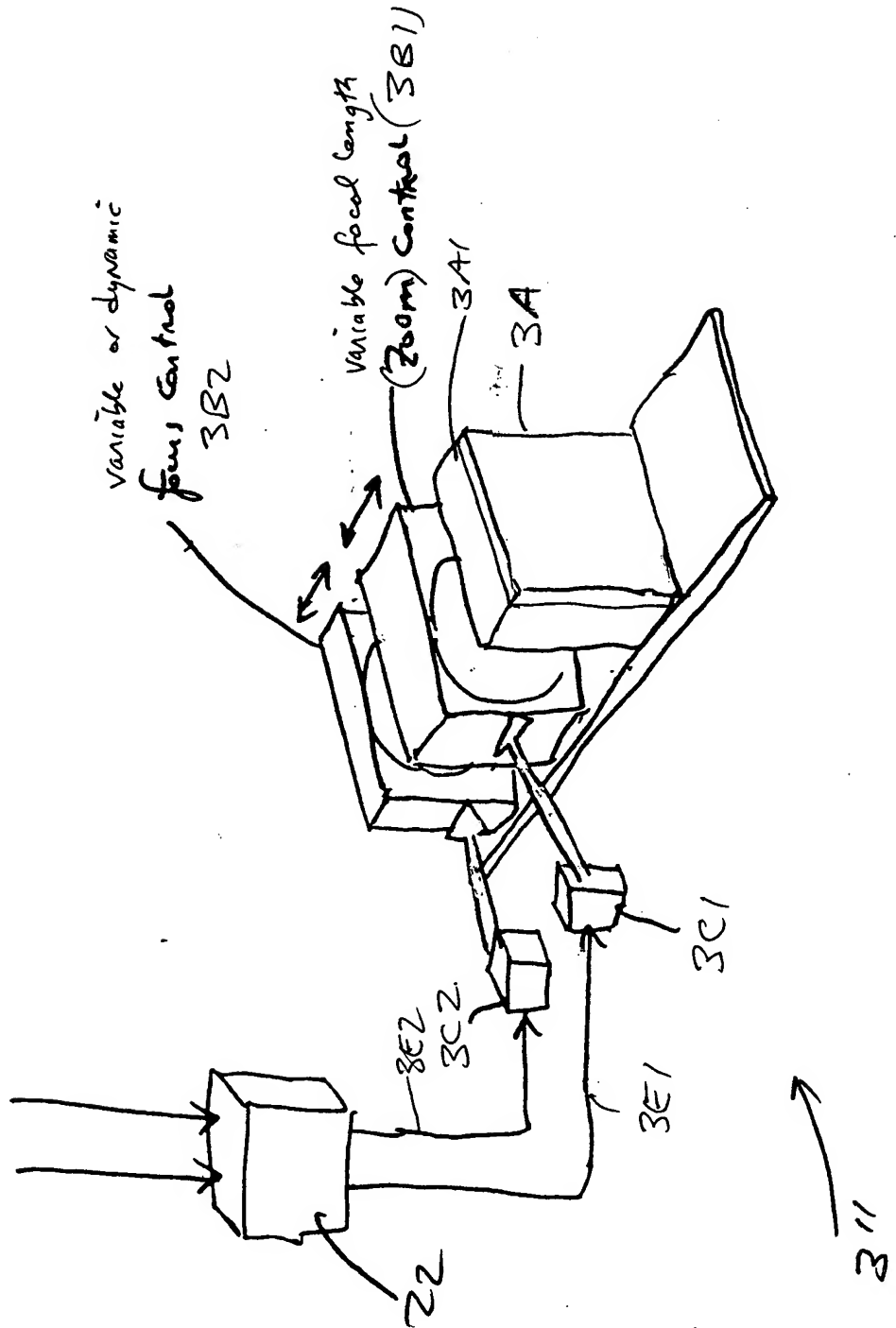


FIG. 3G3

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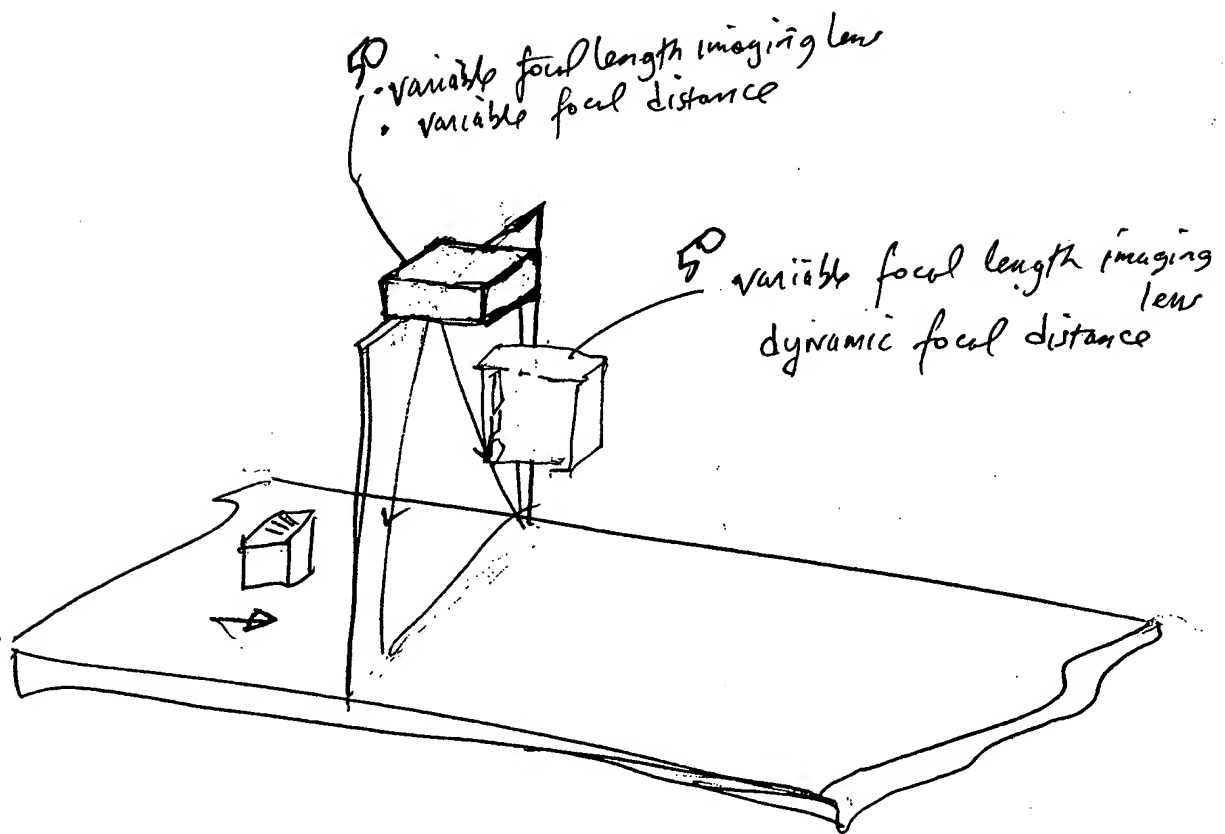


FIG. 3H

00000 0132300T

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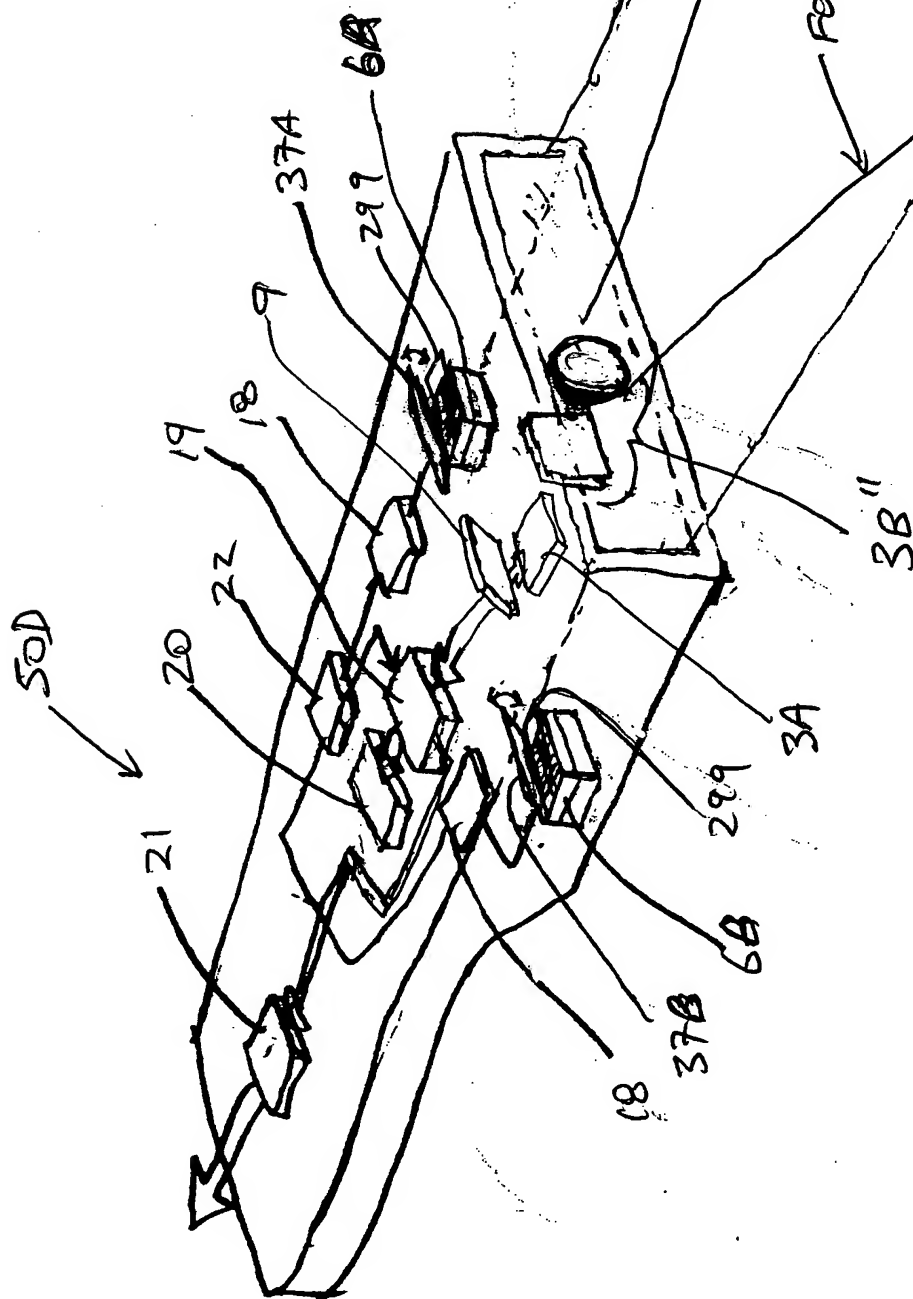


FIG. 3I

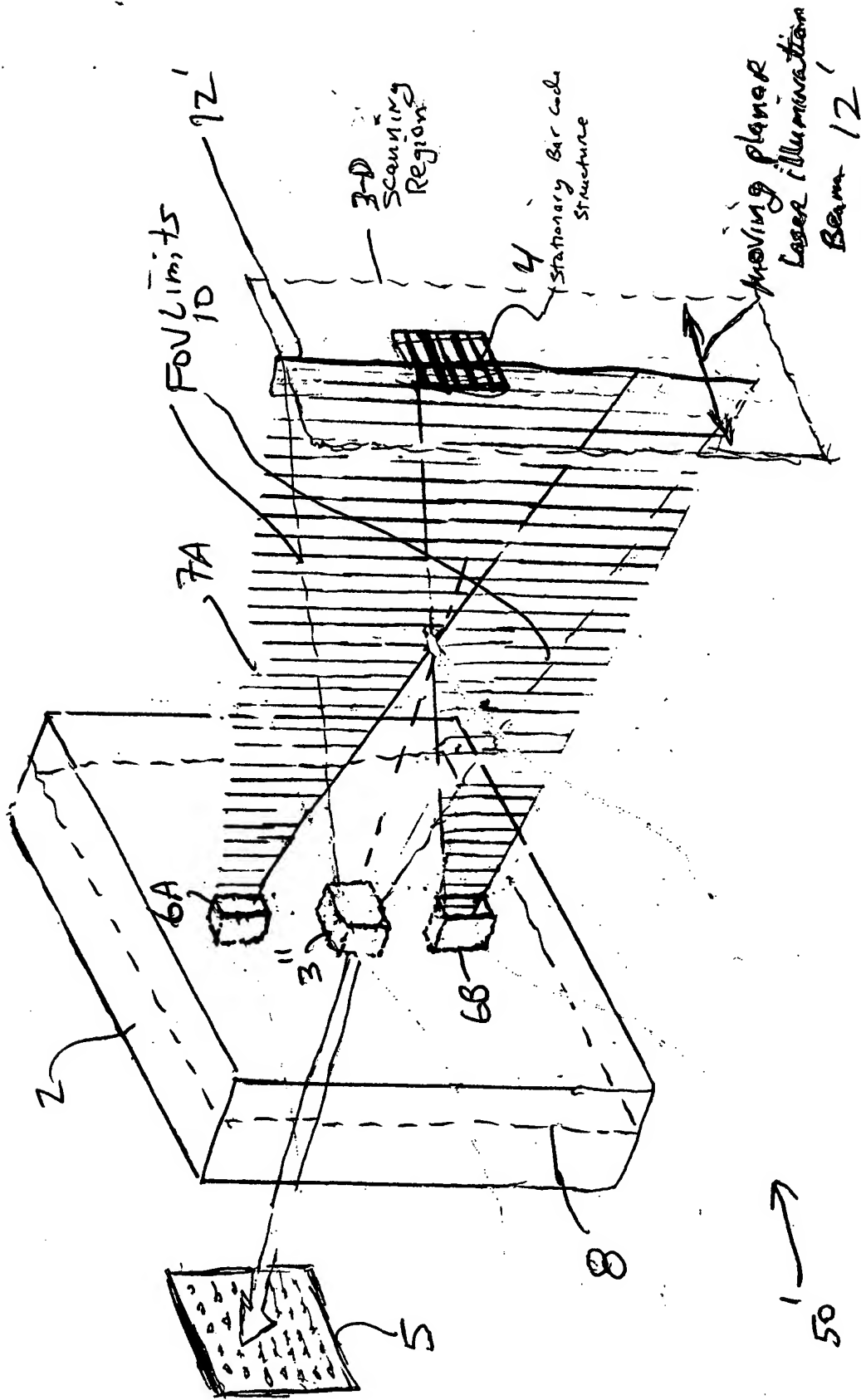


FIG. 3J1

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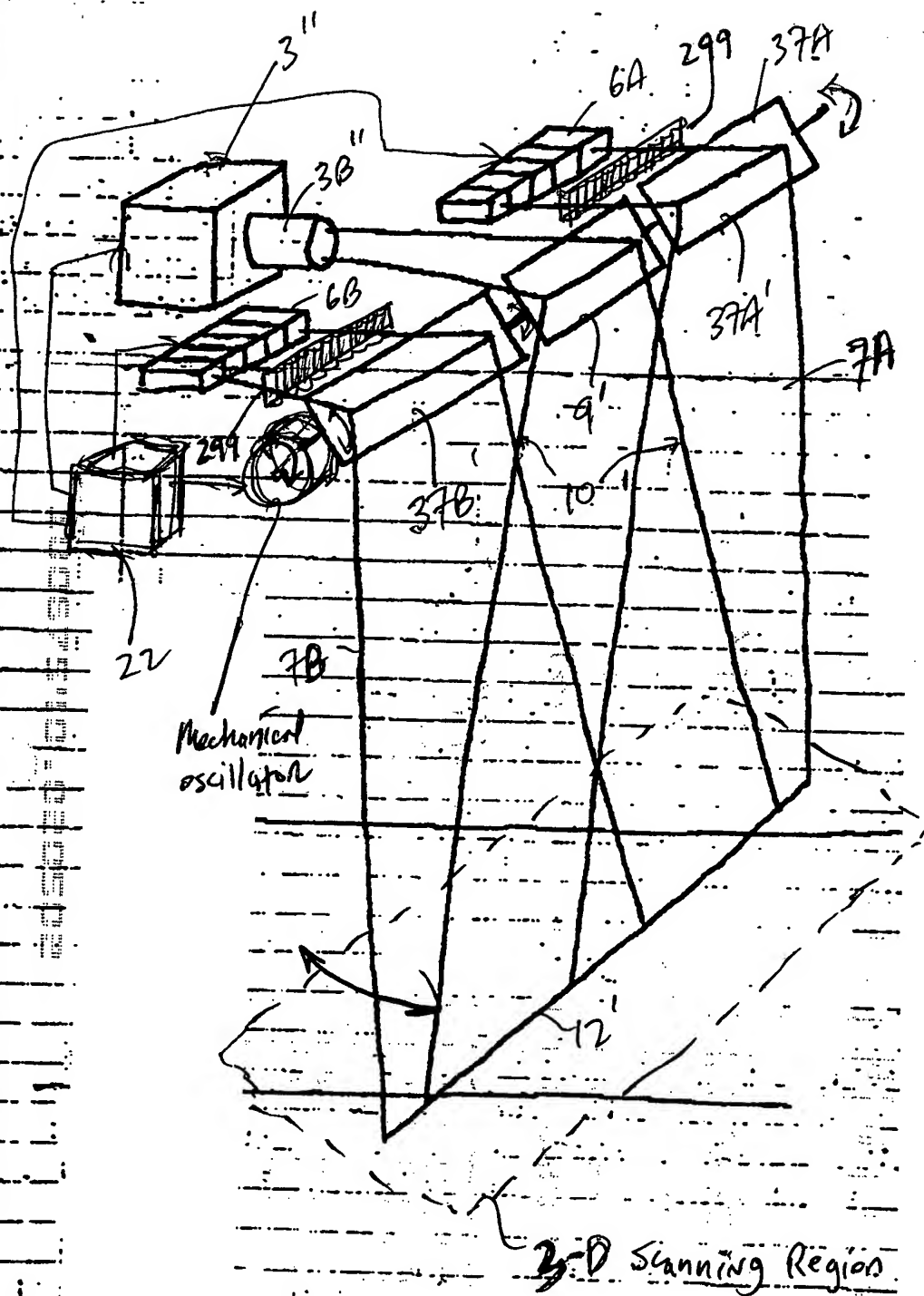


FIG 3J2

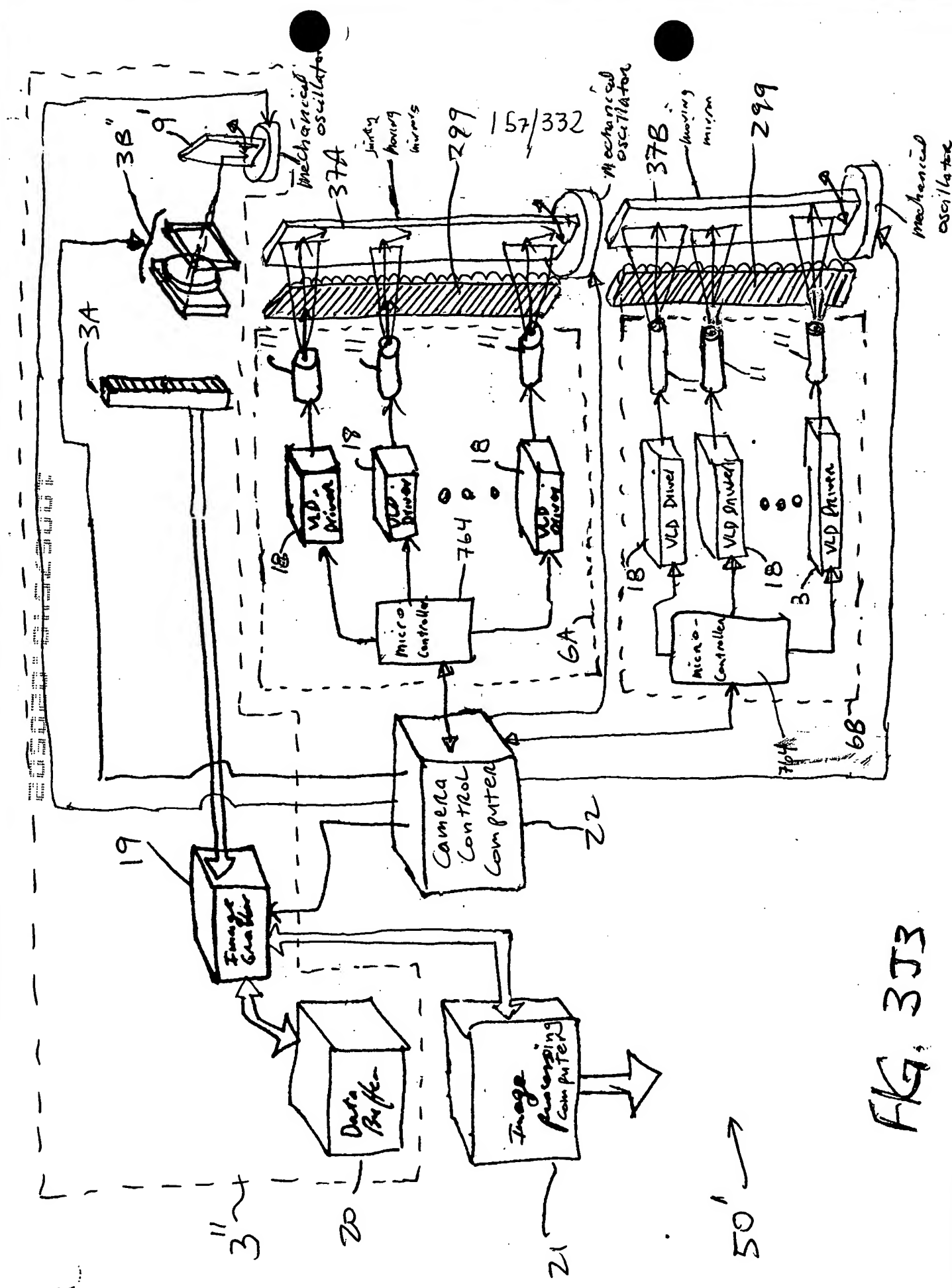


FIG. 353

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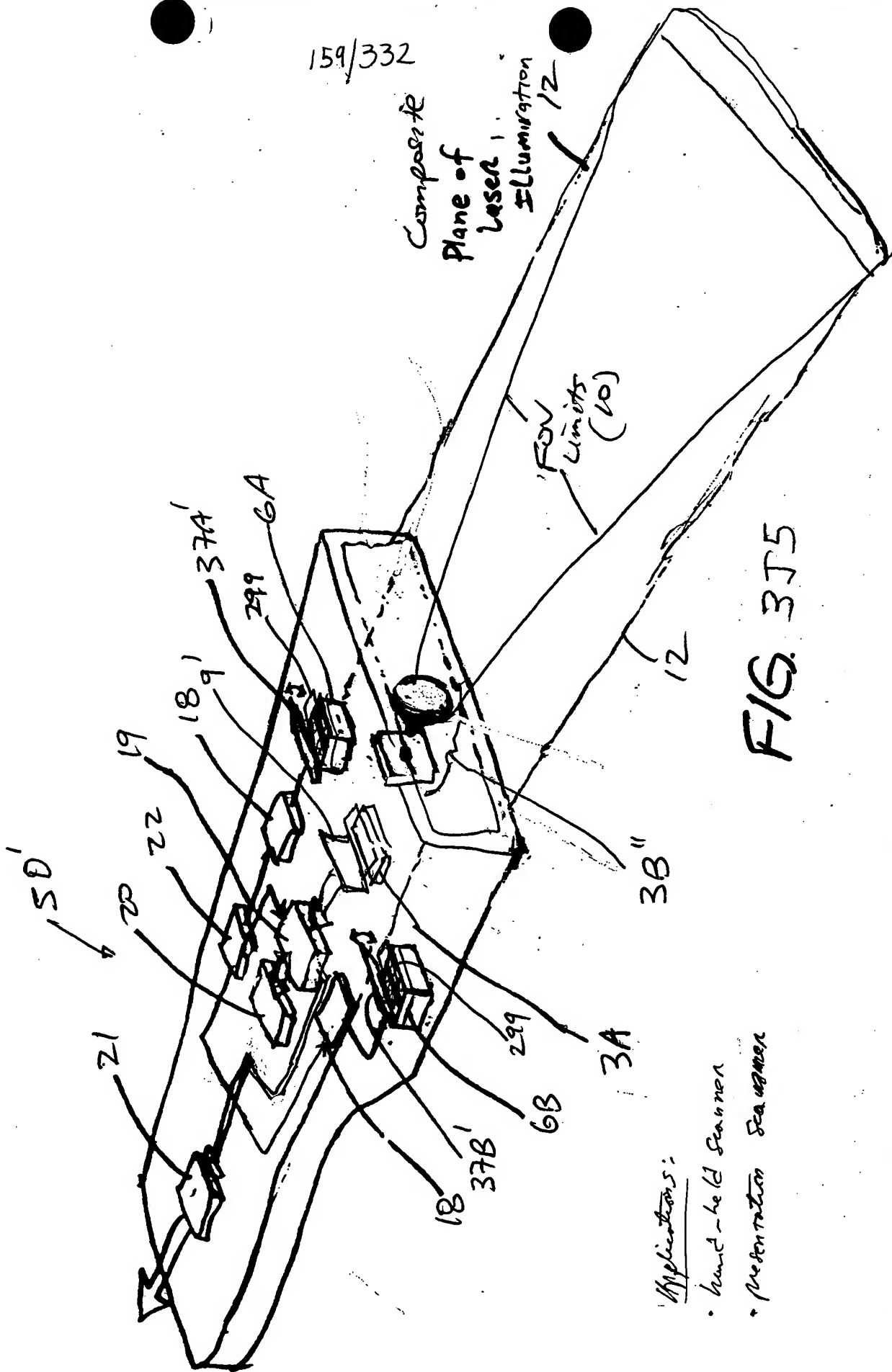
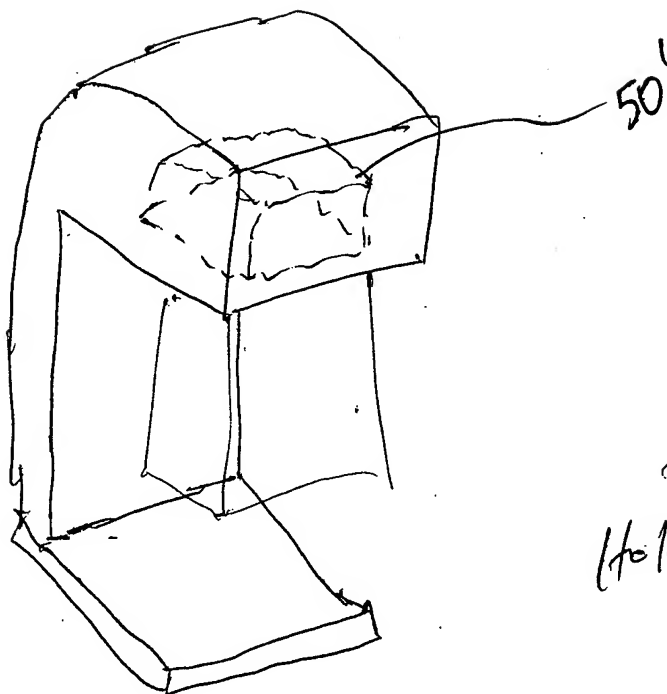


FIG. 3T5

Applications:

- hand-held scanner
- penetration scanner

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2-D
Hold-under
Scanner

FIG. 3J6

0000000152500

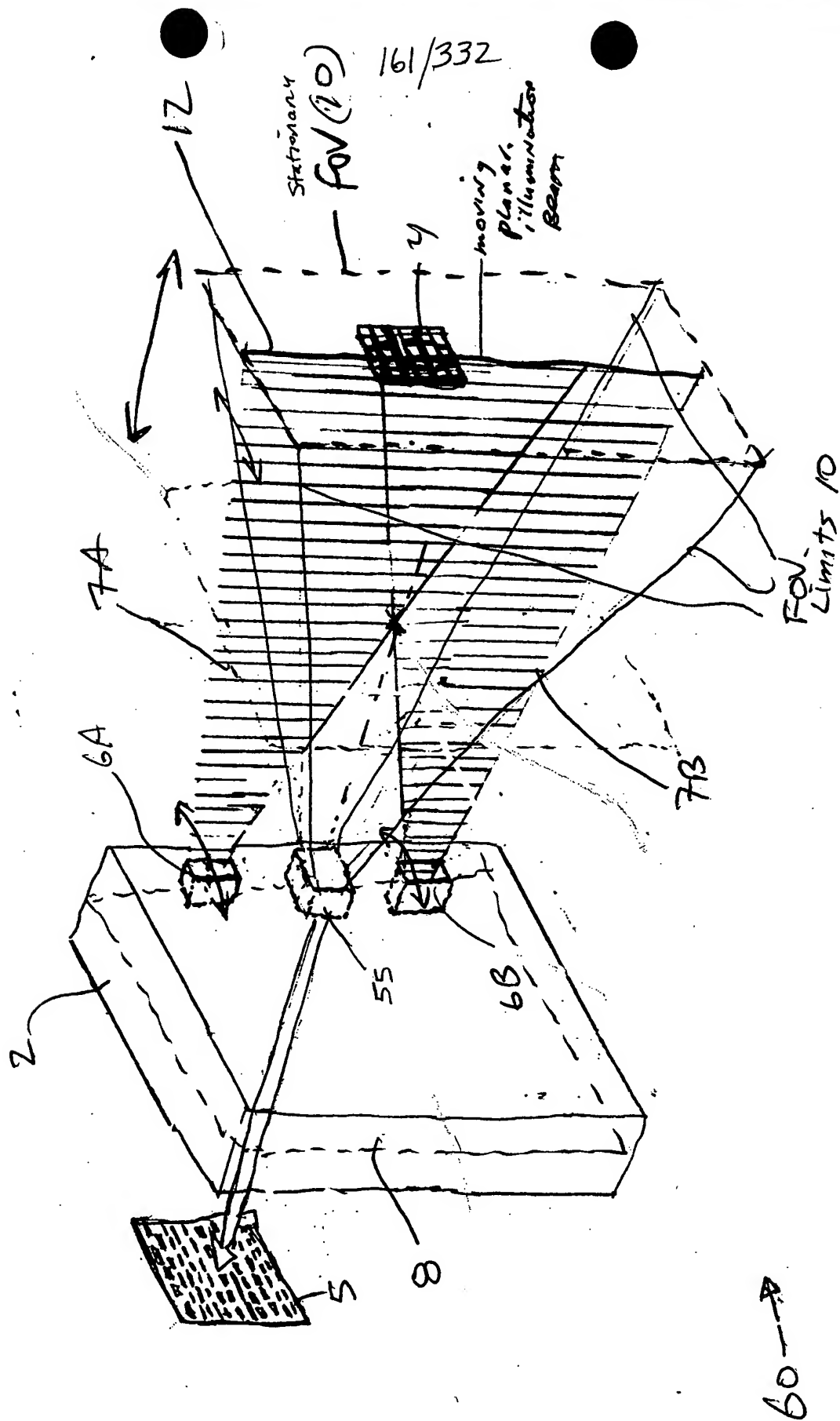


FIG 4A

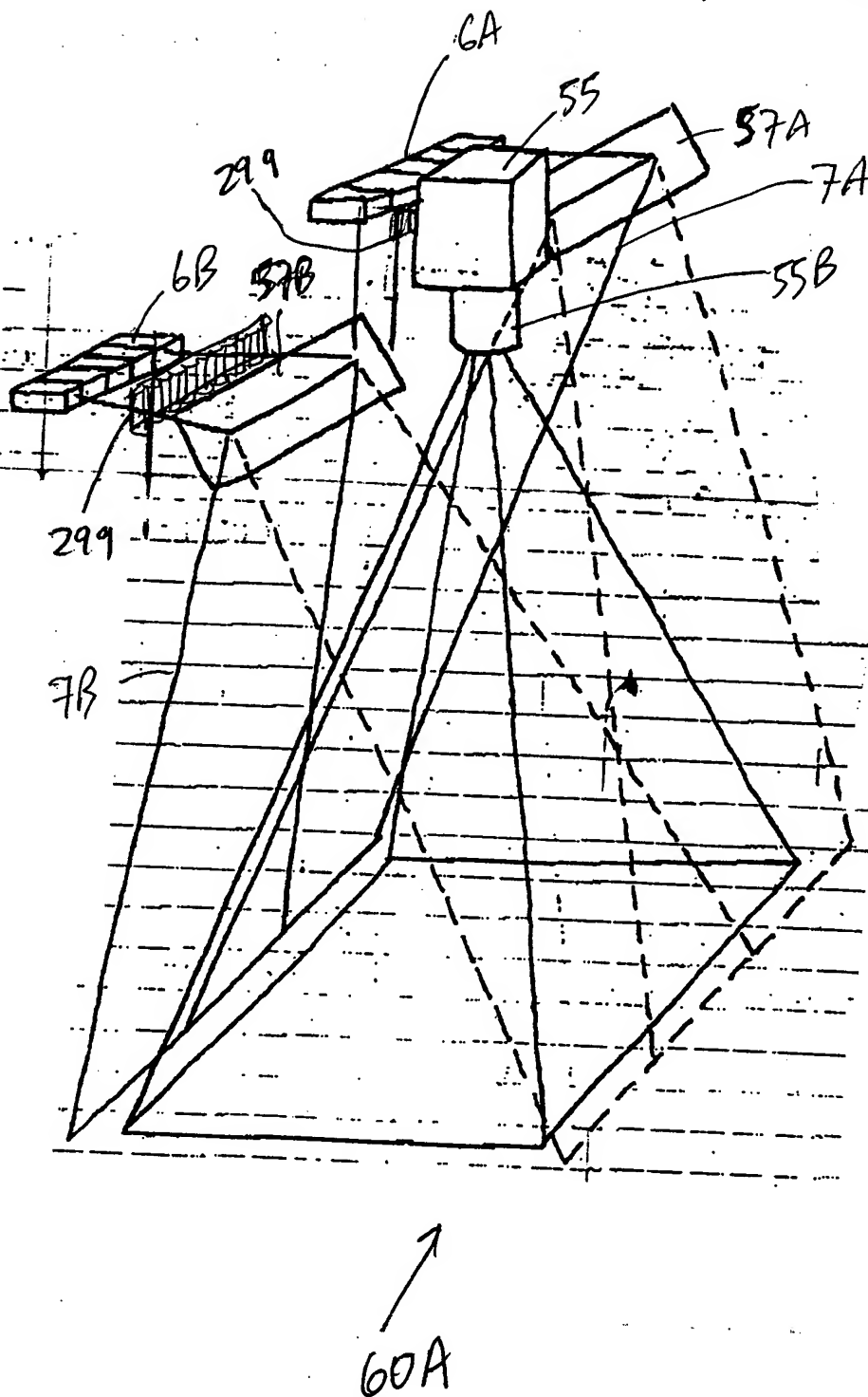


FIG. 4B1

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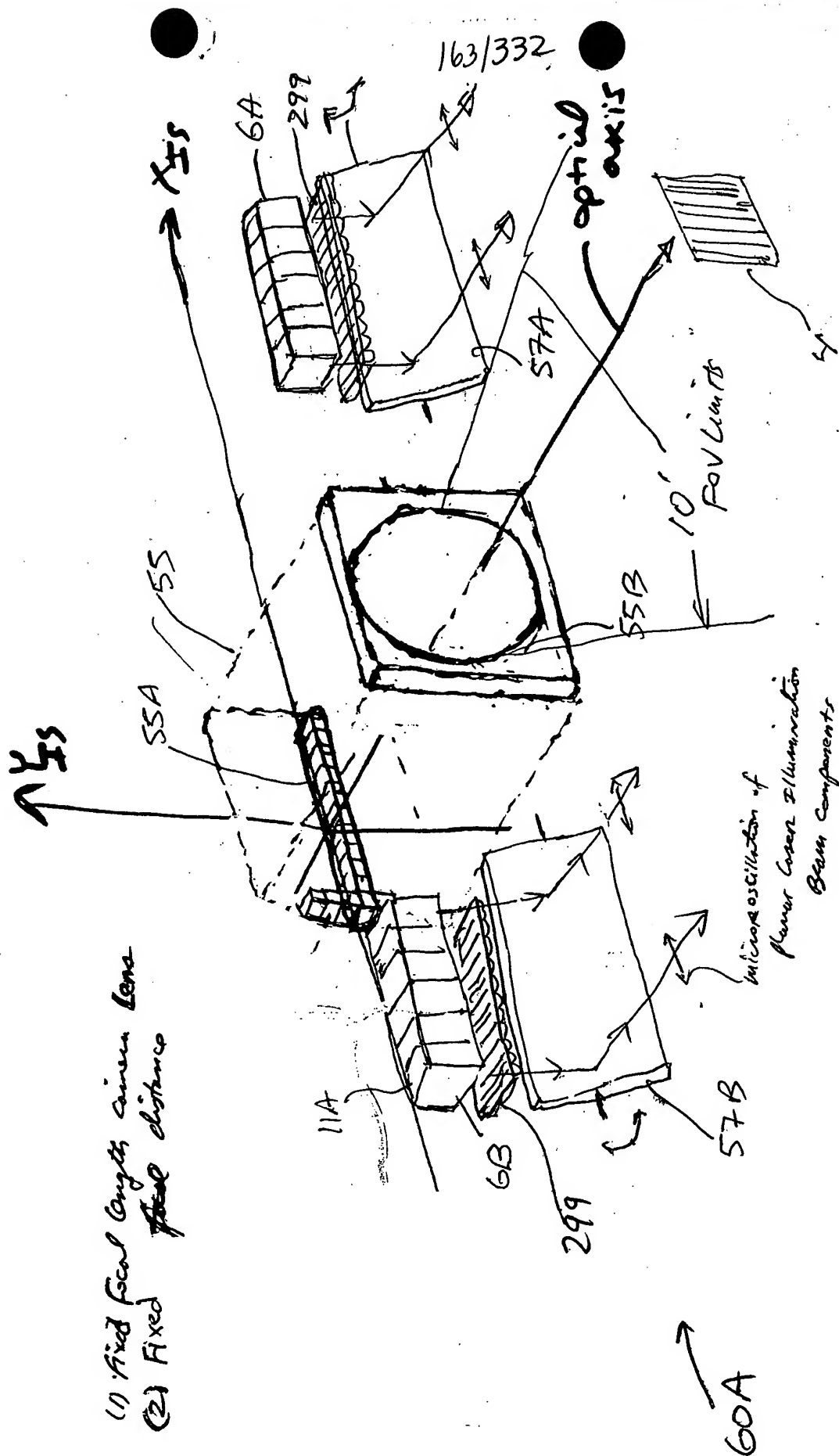


FIG. 4B.2

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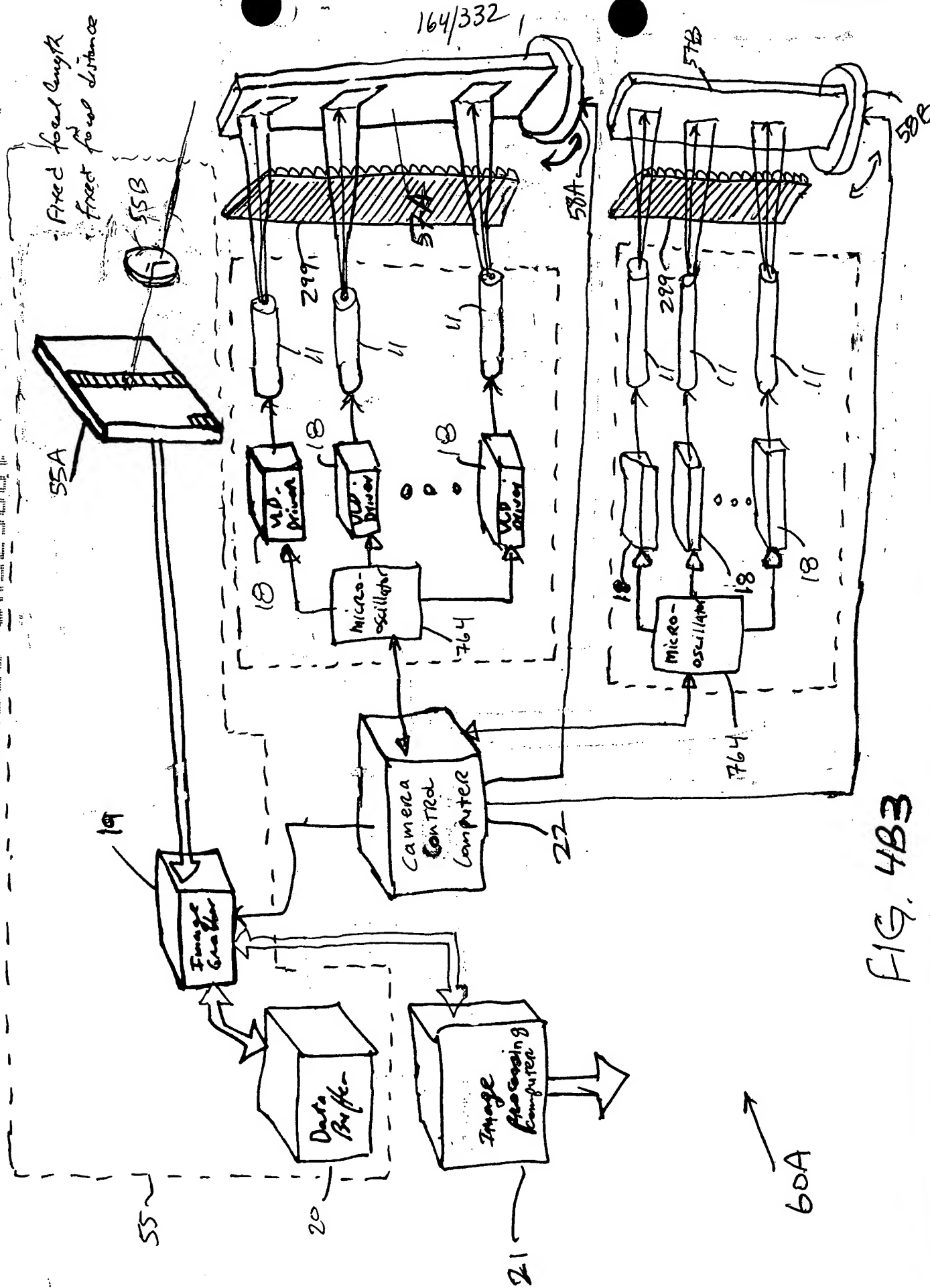


FIG. 4B3

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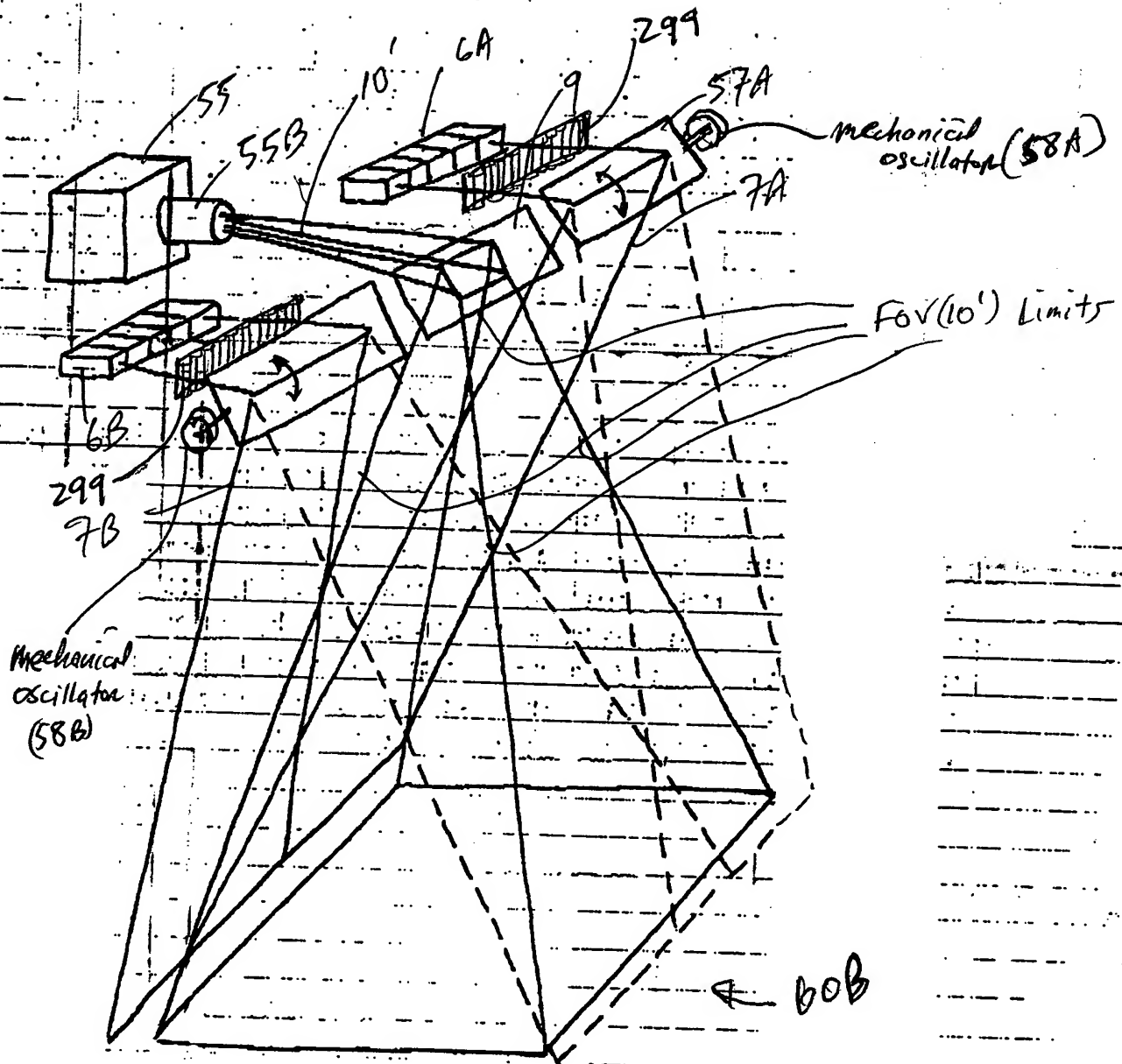


FIG. 4C1

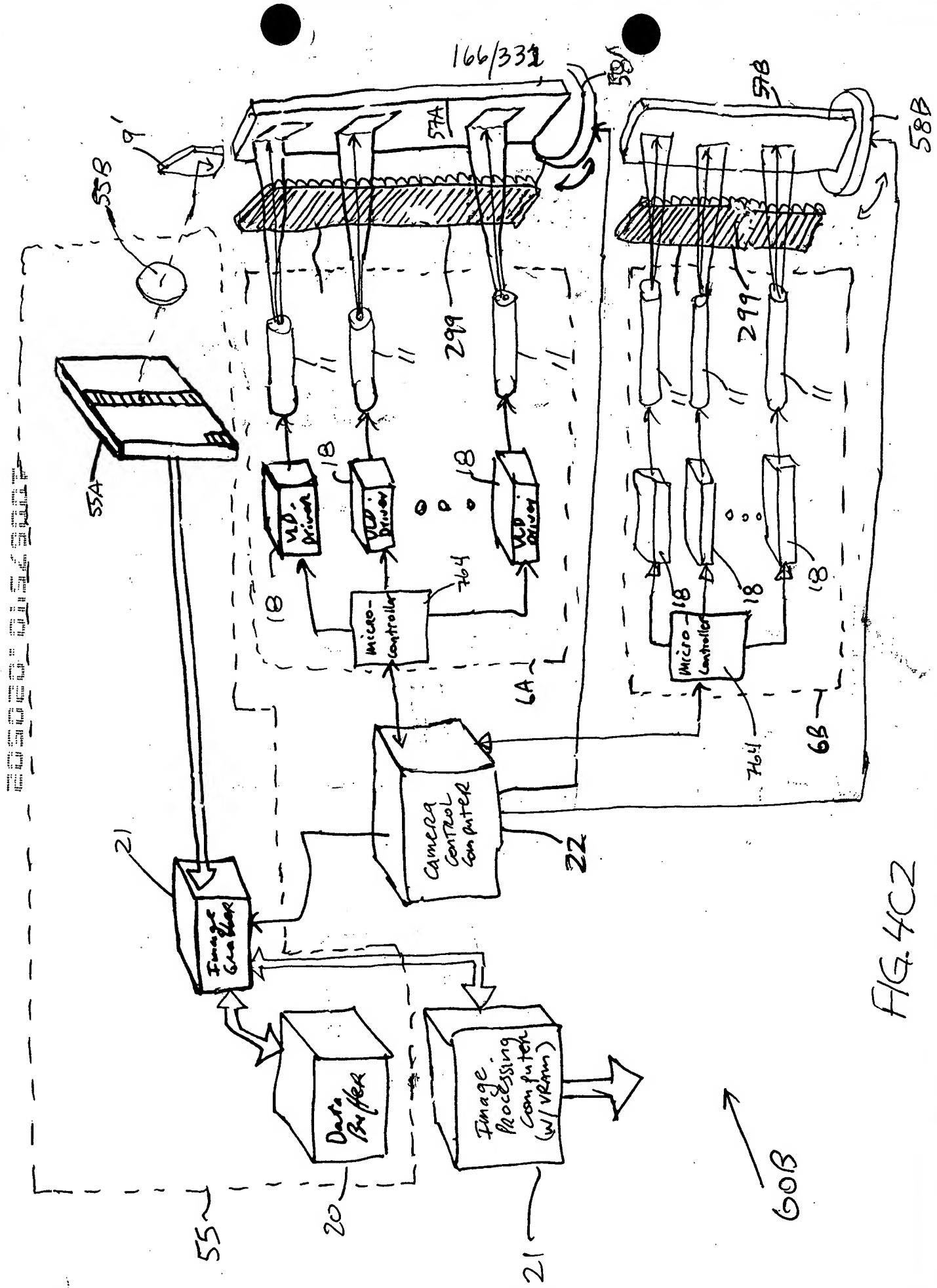


FIG. 4C2

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20000425007

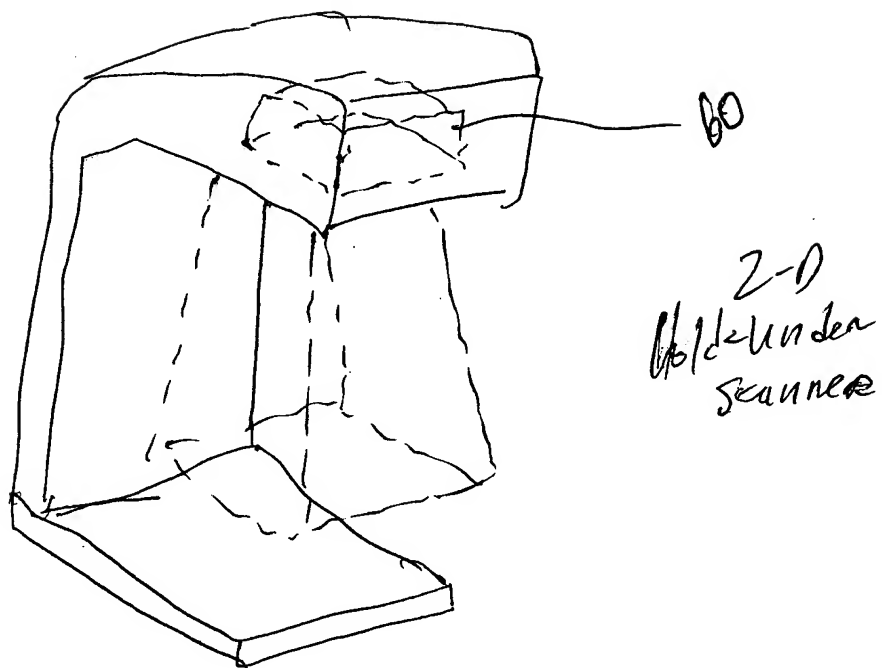


FIG. 4D

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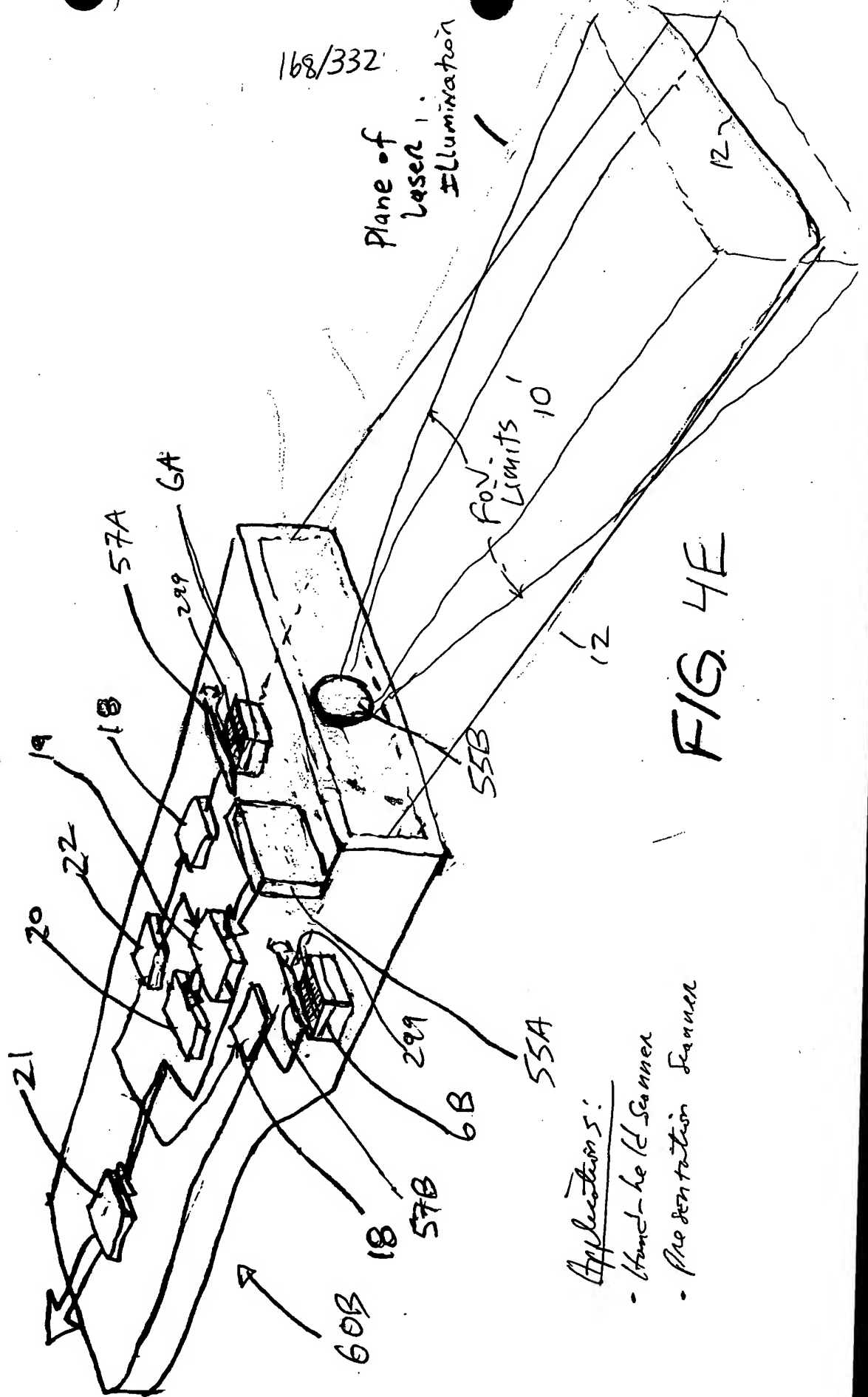


FIG. 4E

Applications:

- Hand-held Scanner
- Presentation Scanner

$\frac{d}{dt} \left(\frac{\partial L}{\partial v^i} \right) - \frac{\partial L}{\partial x^i}$

moving
planar laser
illumination
beam

stationary
FOV(10)



AG 5A

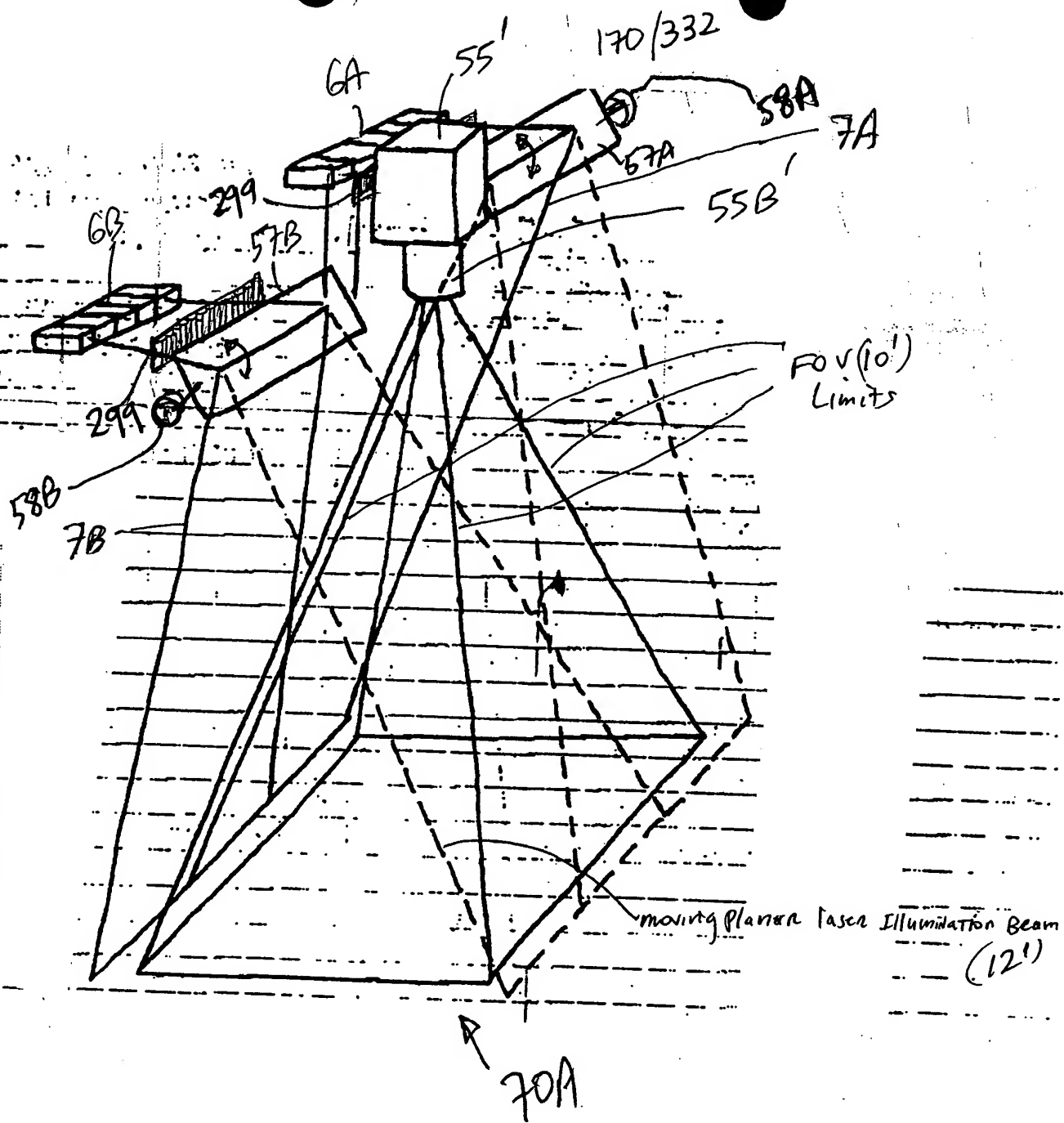


FIG 5B1

100

2000 01325007

- (1) Fixed focal length camera lens
- (2) Variable focal distance

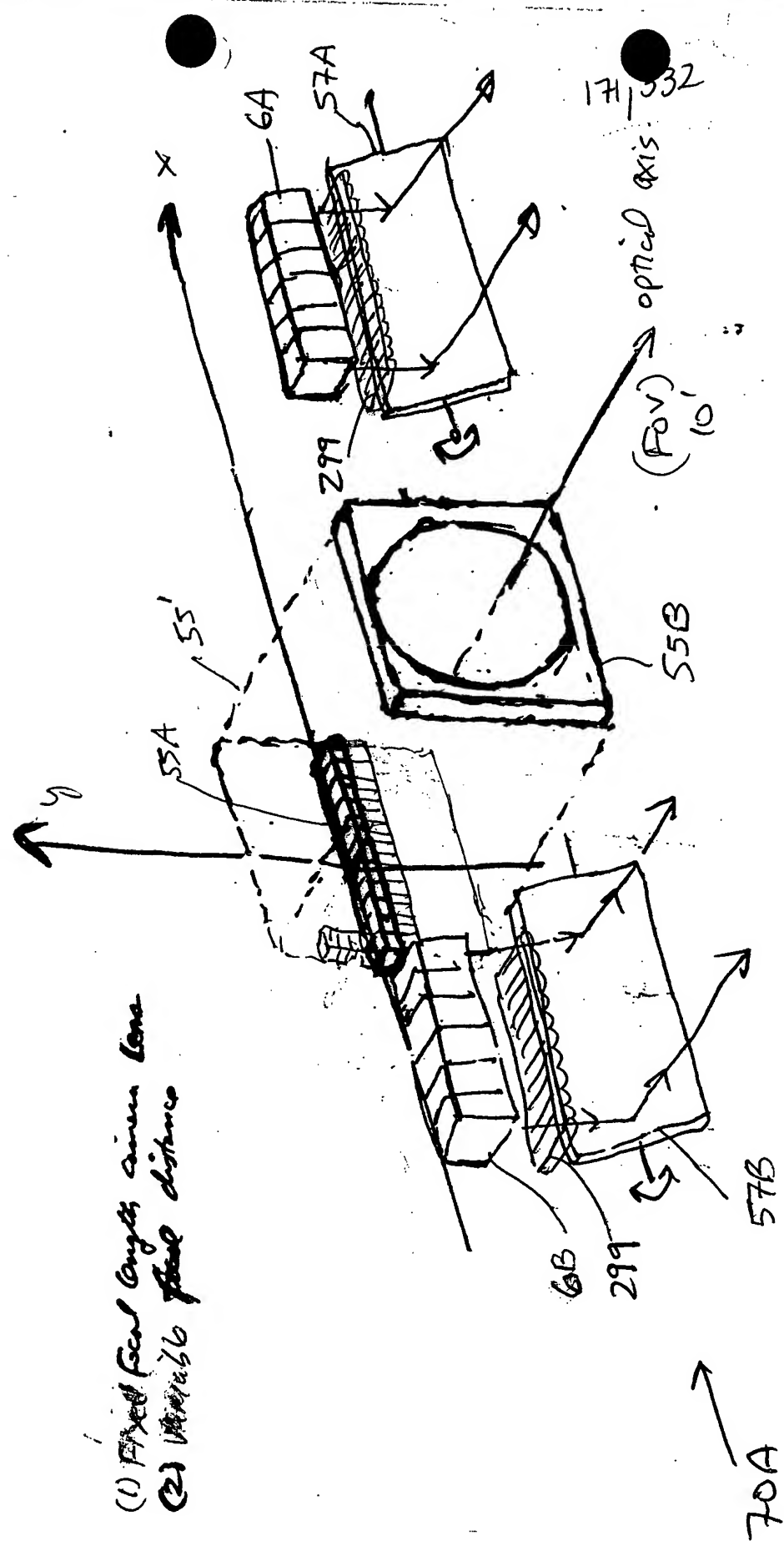


FIG. 5B2

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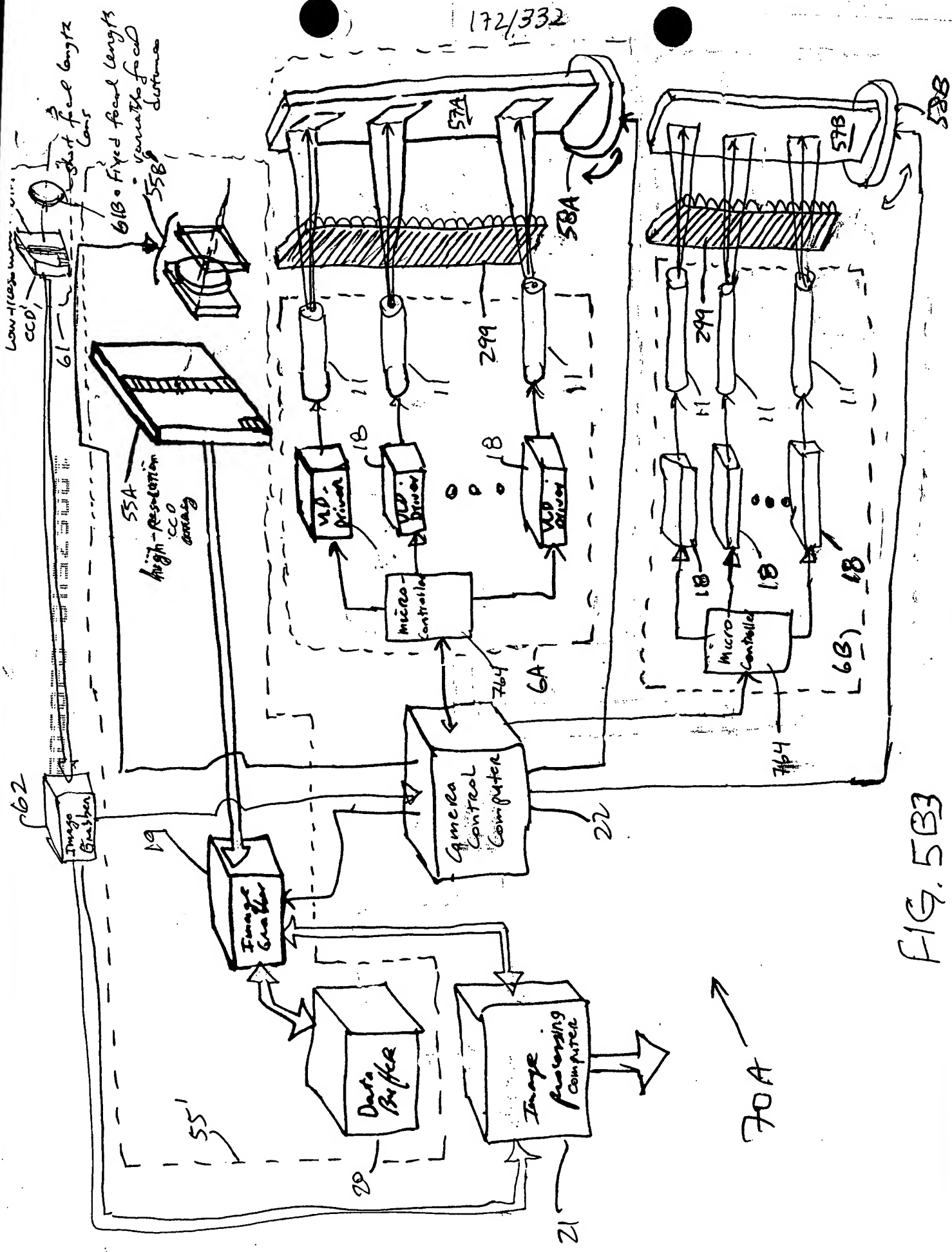
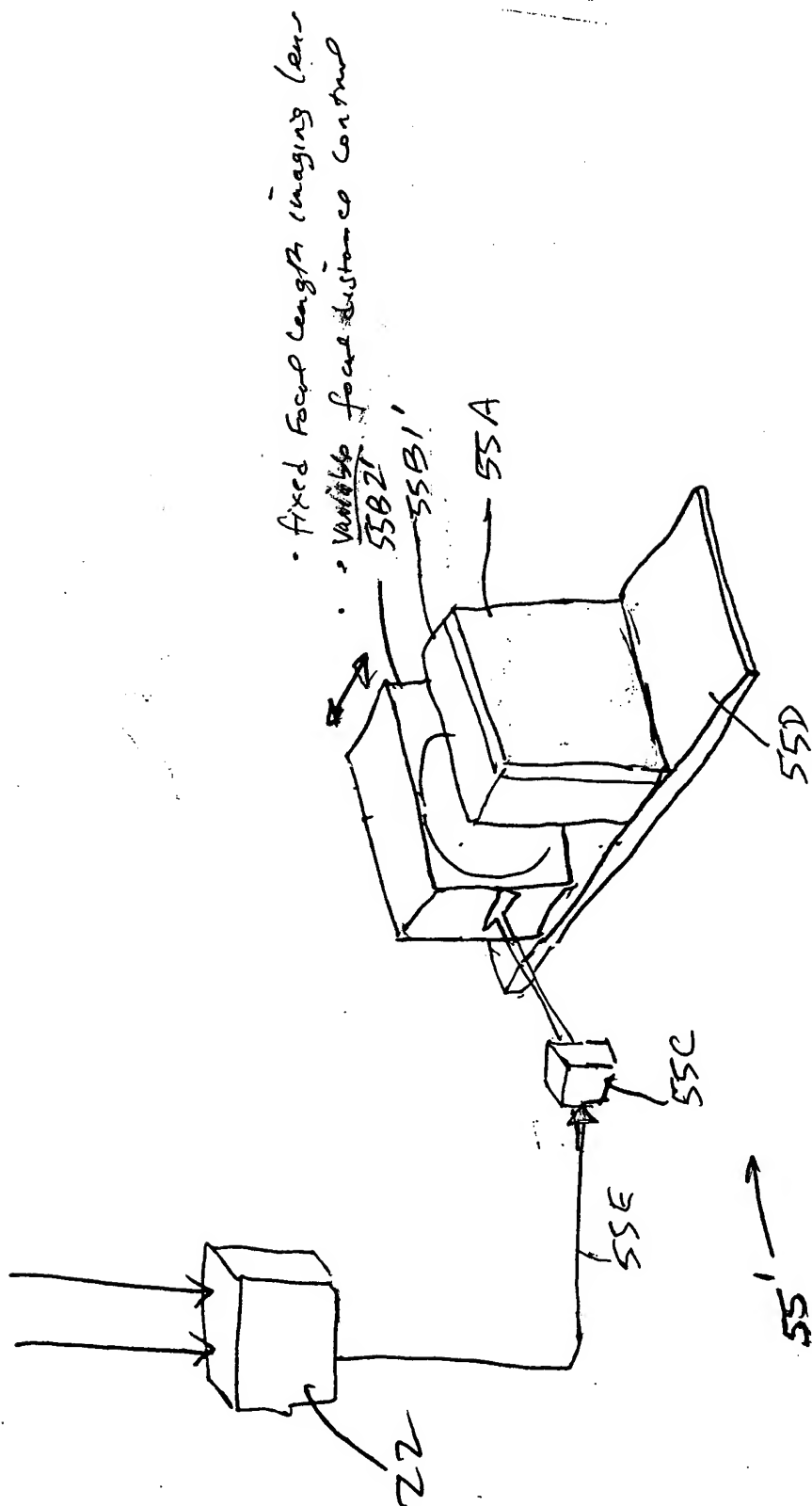


FIG. 5B3

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• fixed focal length imaging lens
• ~~variable~~ variable focal distance control

FIG. 5B4

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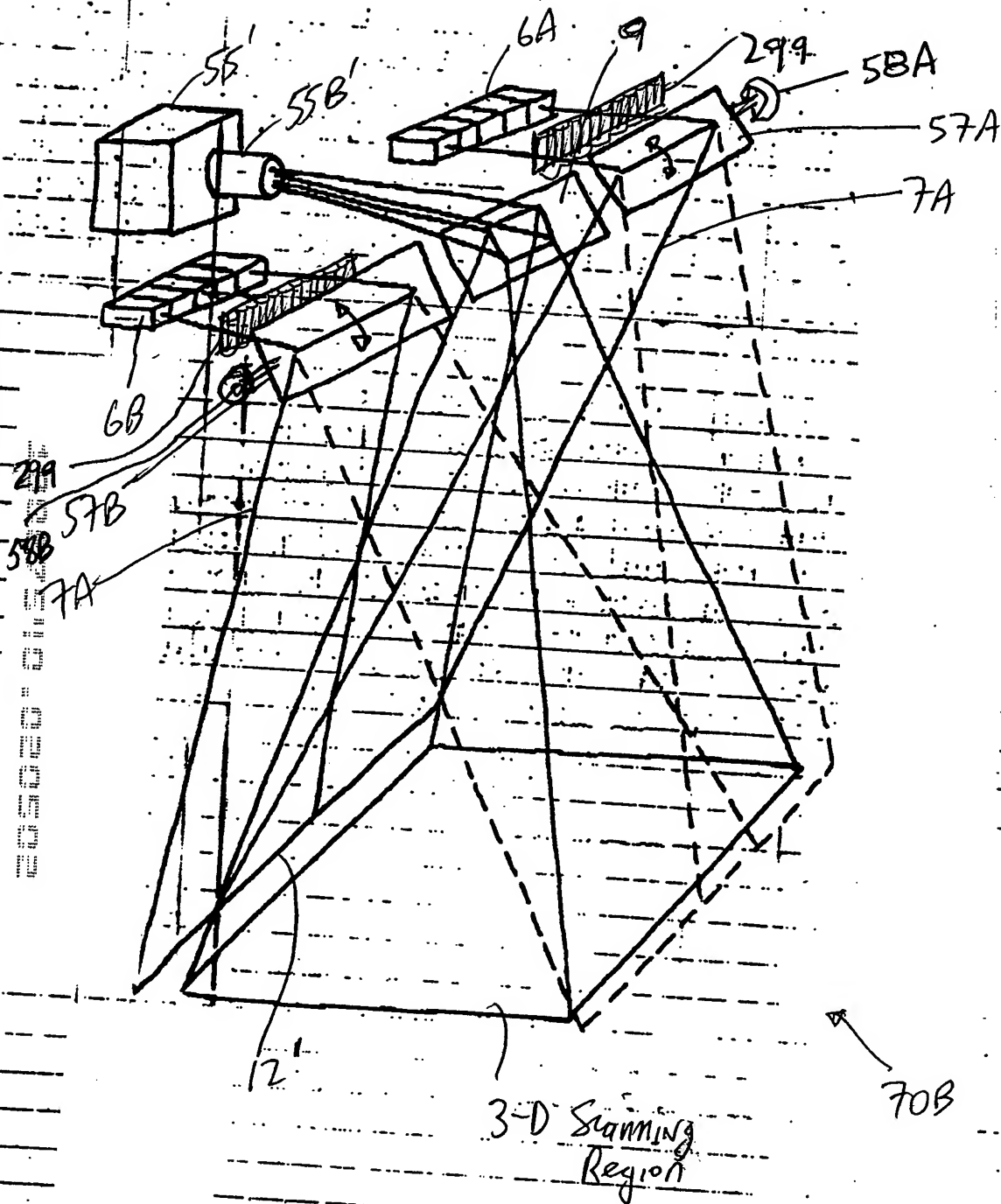
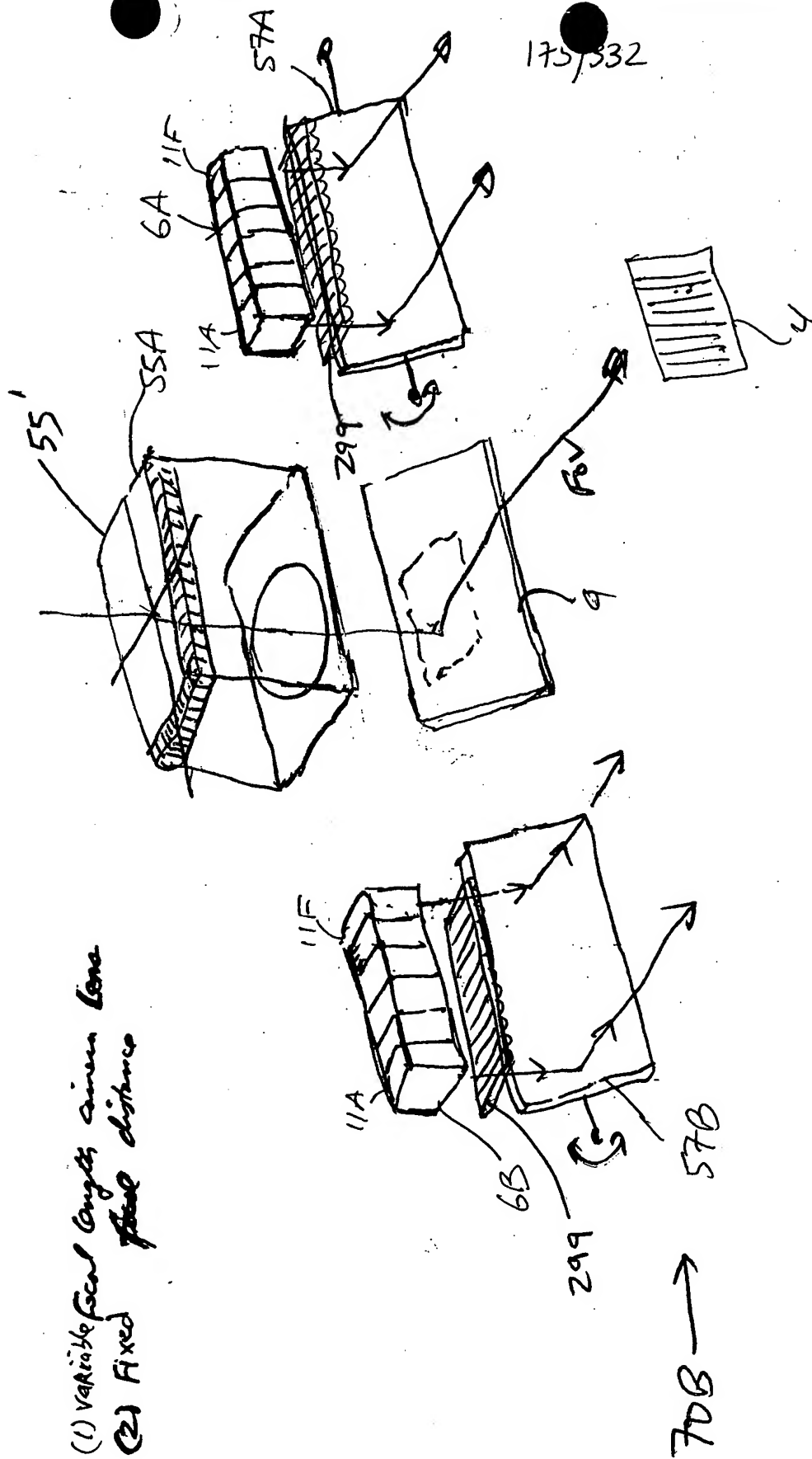


FIG. 5C1

600000132000

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(1) Variable focal length, same lens
(2) Fixed focal distance

FIG. 502

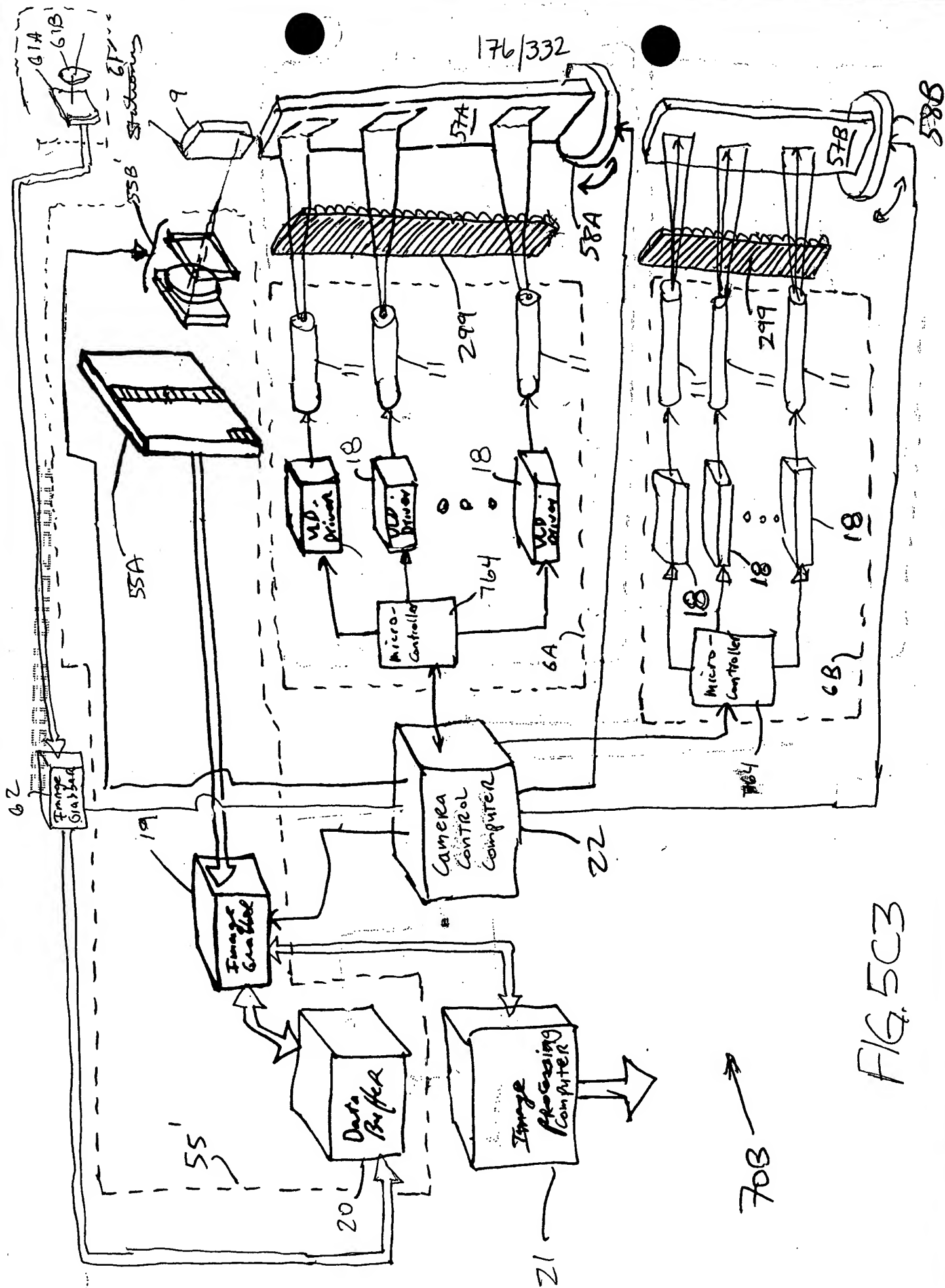


FIG. 5C3

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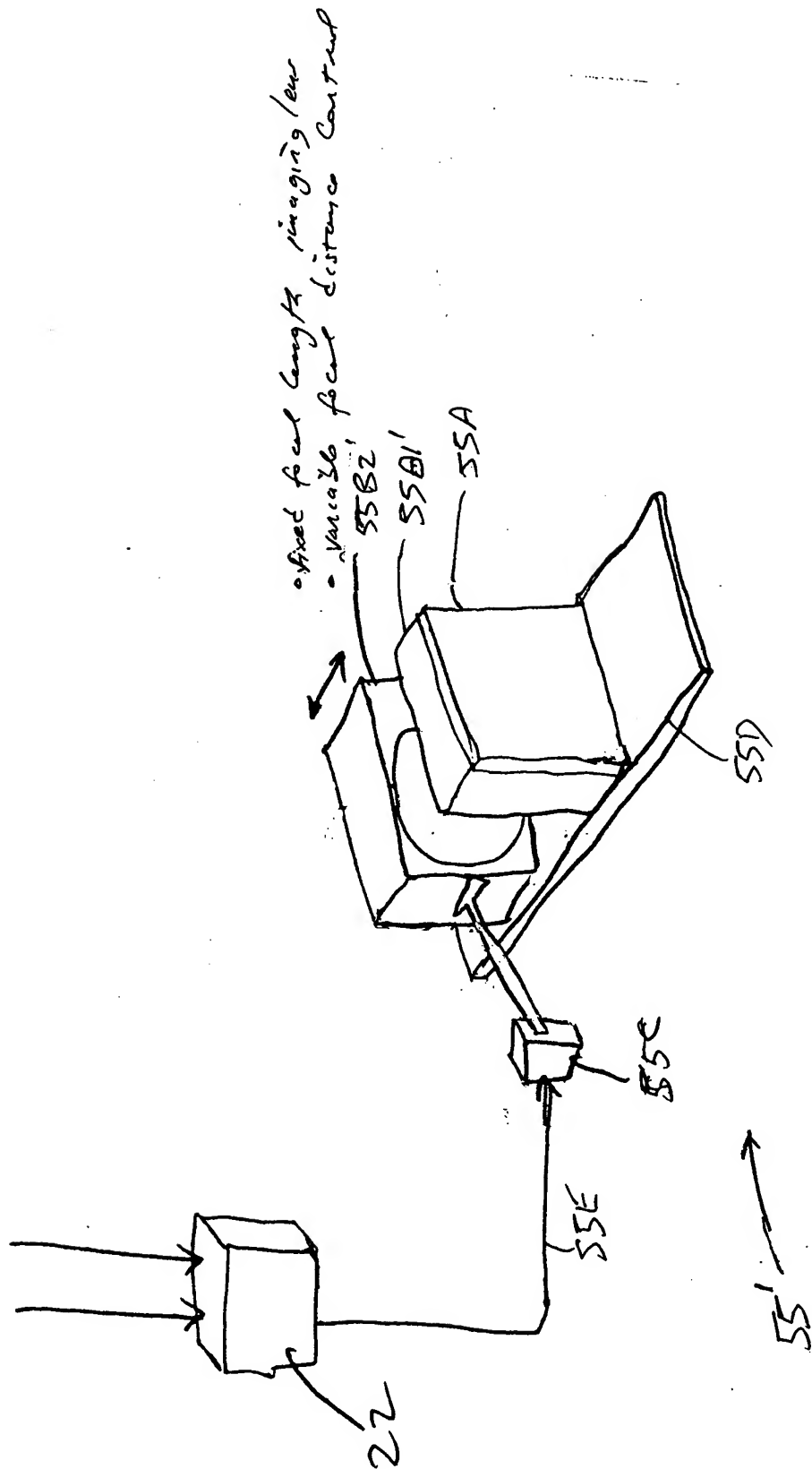


FIG. 5C4

Figure 1 displays 12 chemical structures, labeled (a) through (l), arranged vertically. These structures represent various substituted benzene derivatives, including phenols, anilines, and substituted benzenes with different functional groups and substituents.



FIG. 5D

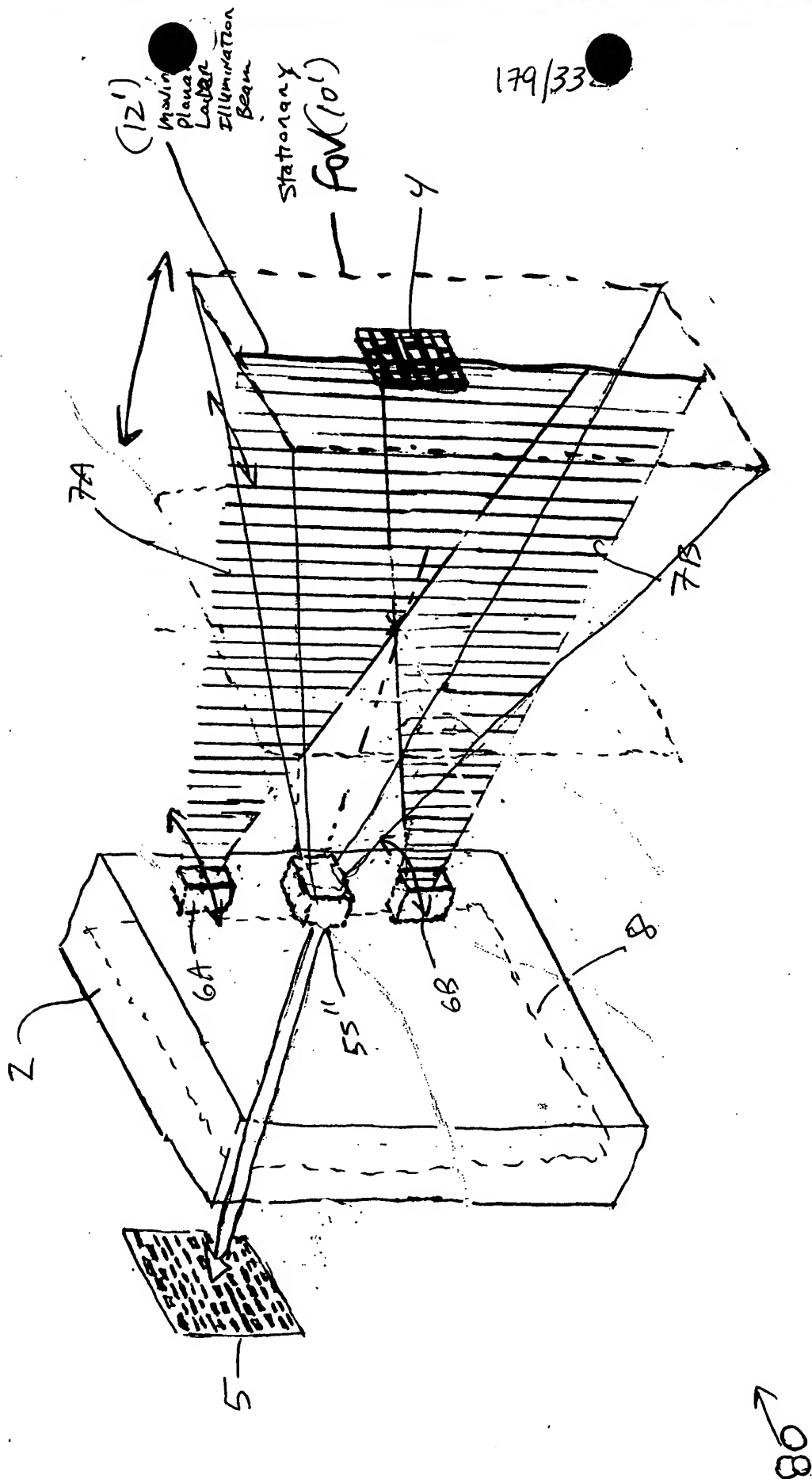


FIG. 6A

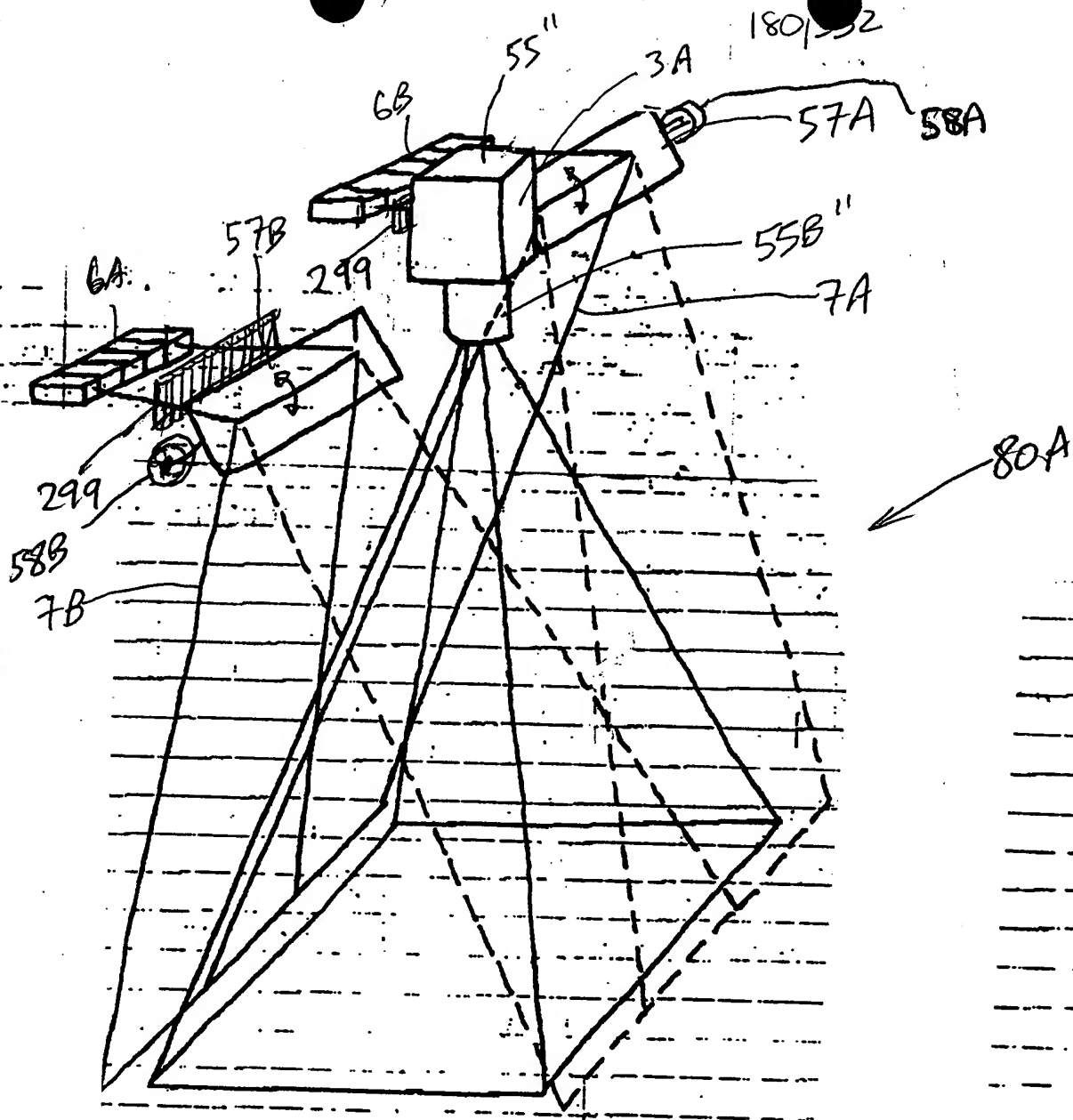


FIG. 6B1

SECRET

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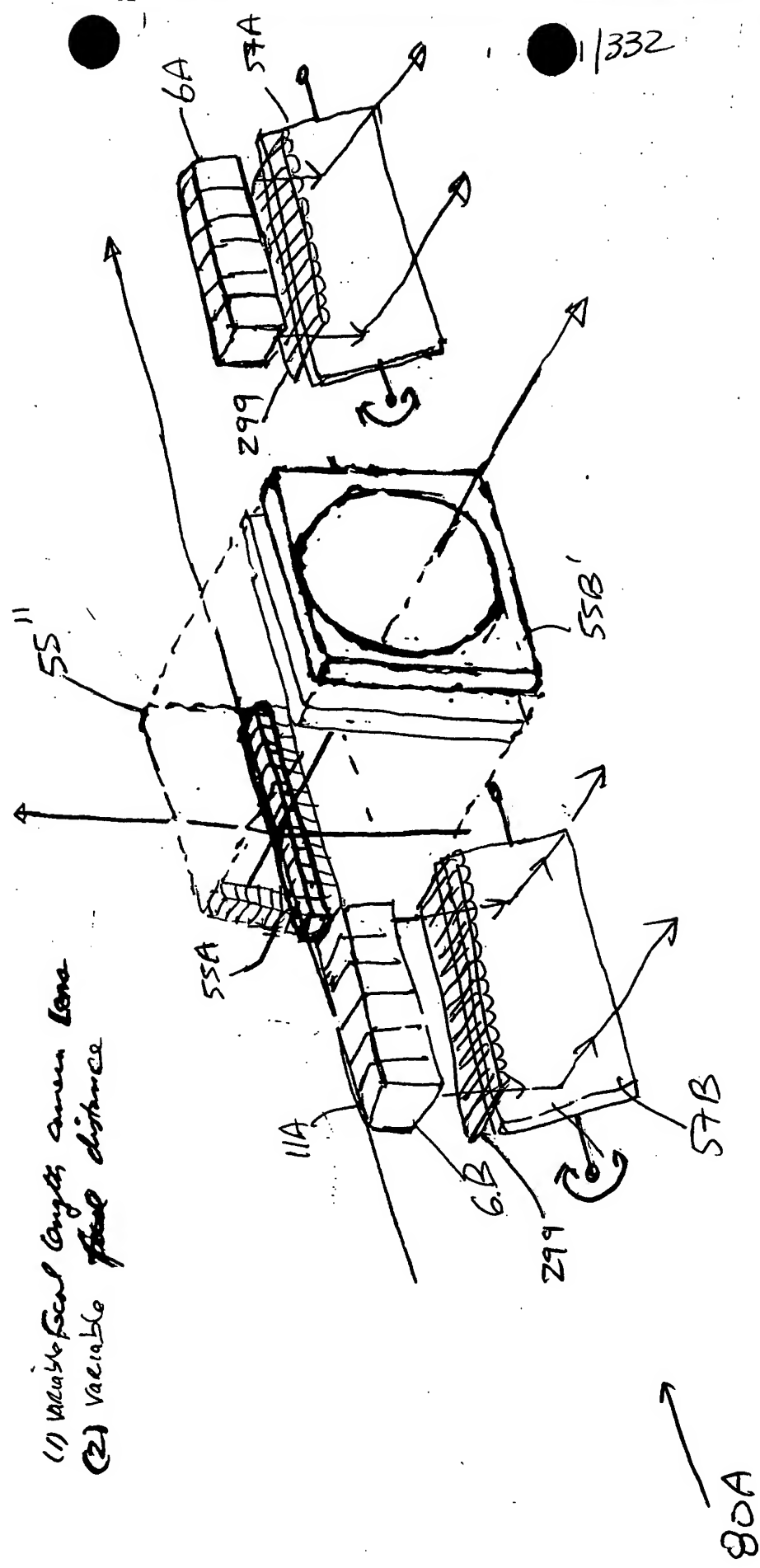
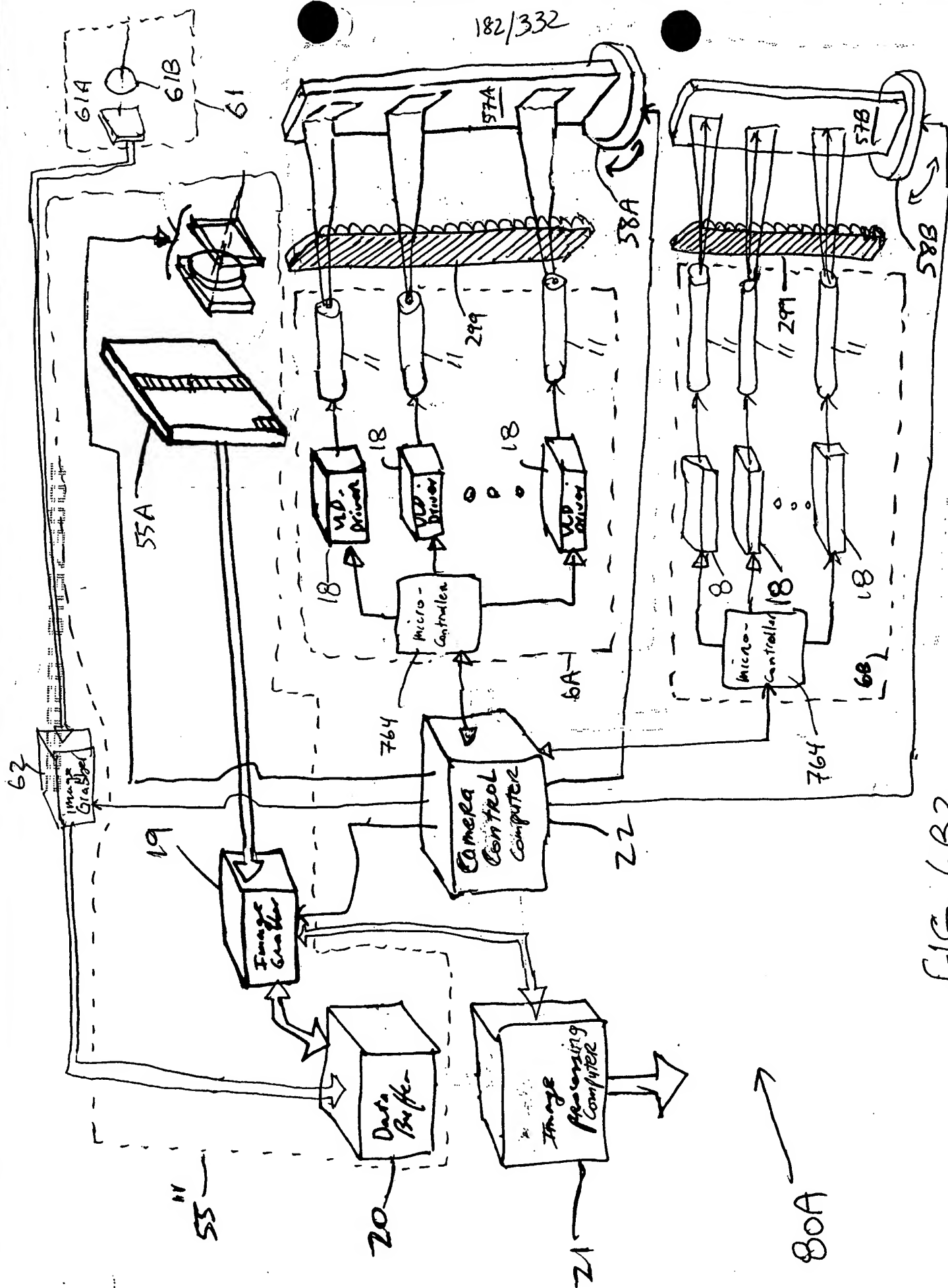


FIG. 6B2



1009410 01325001

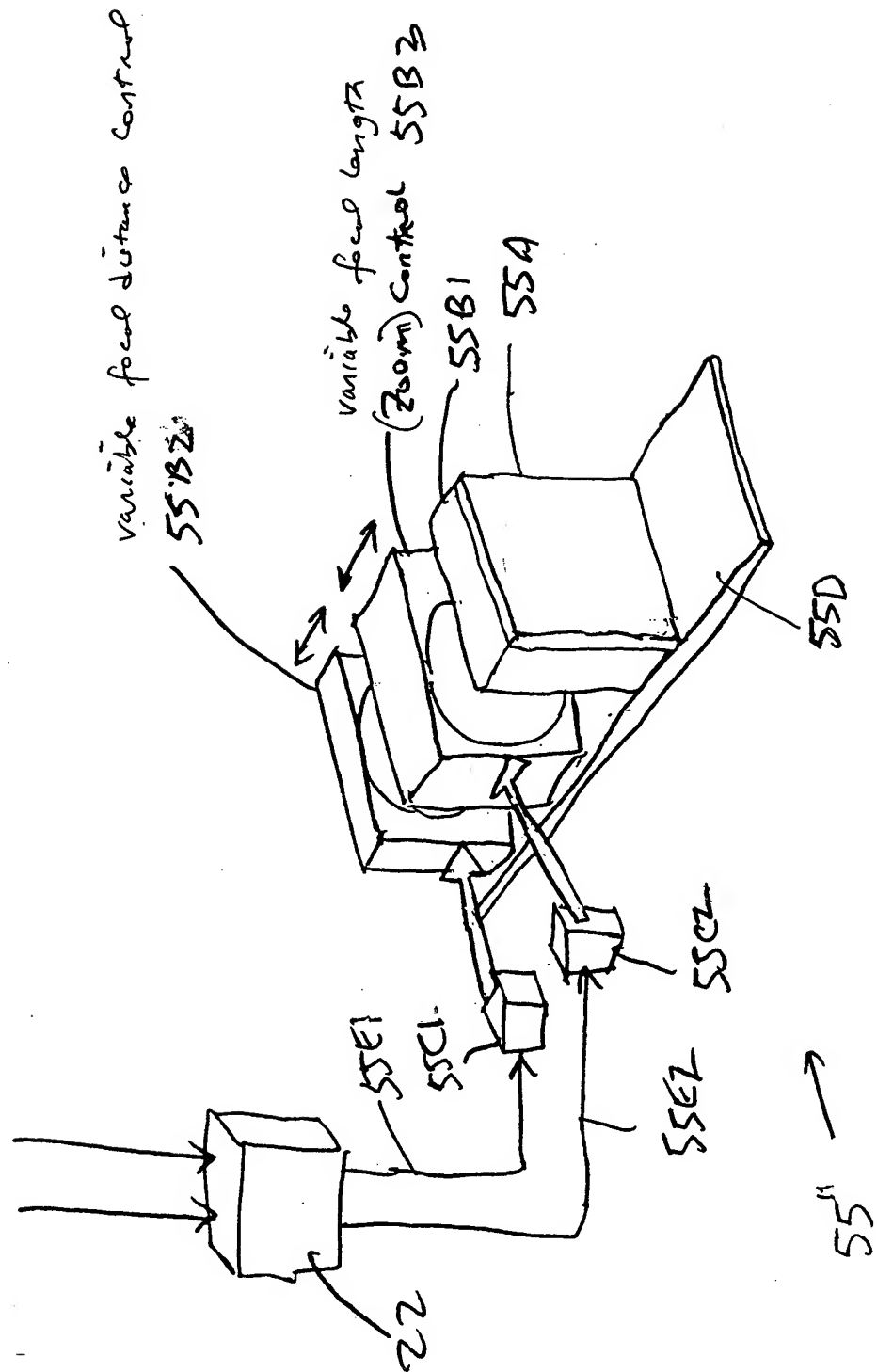


FIG. 6B4

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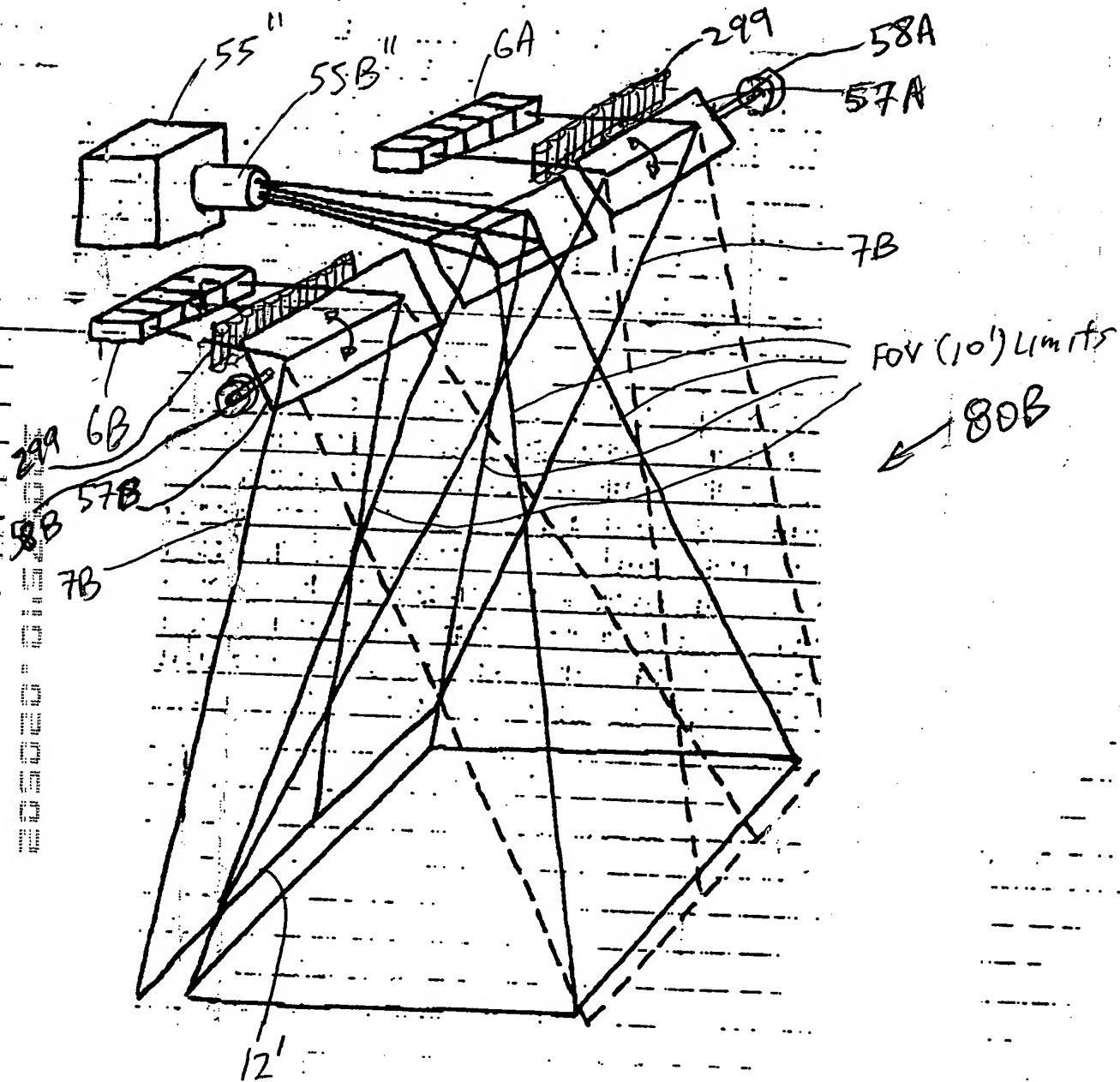
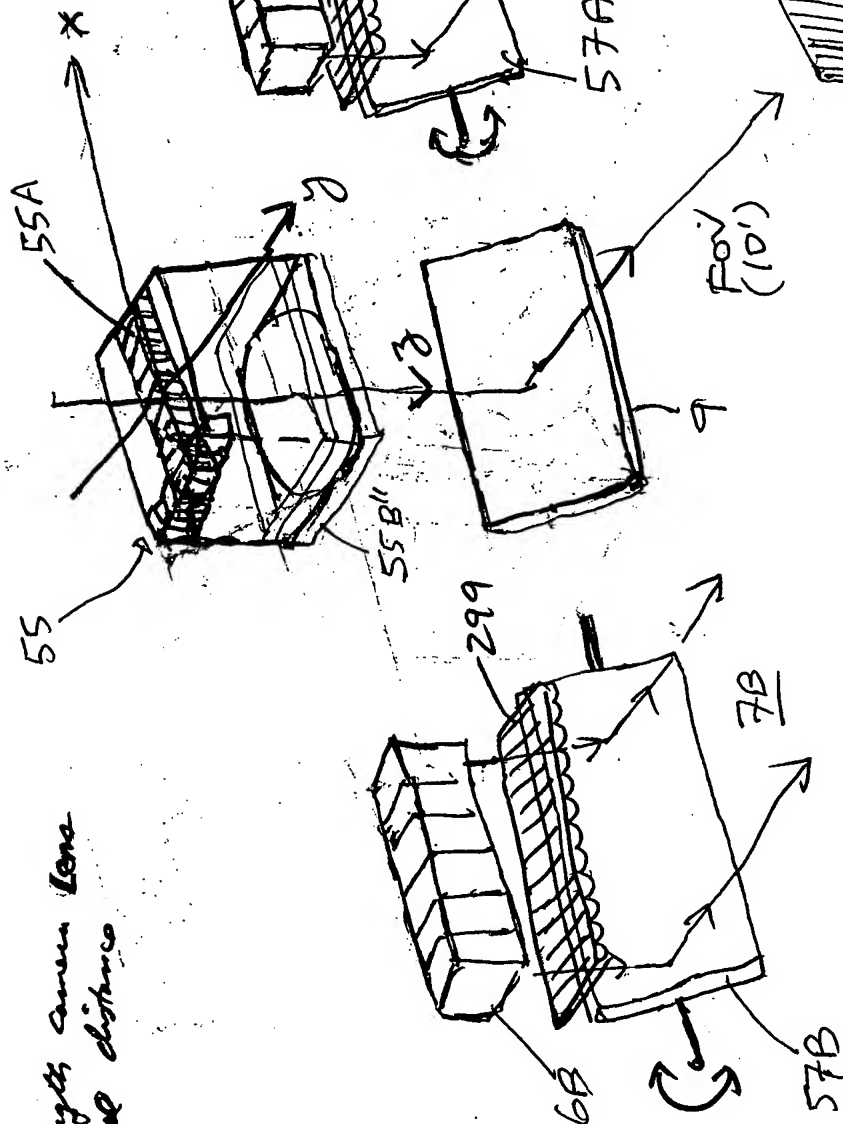


FIG. 6C1

2000000 2000000

- (1) Variable focal length camera lens
- (2) Variable fluid distance



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FIG. 6C2

800

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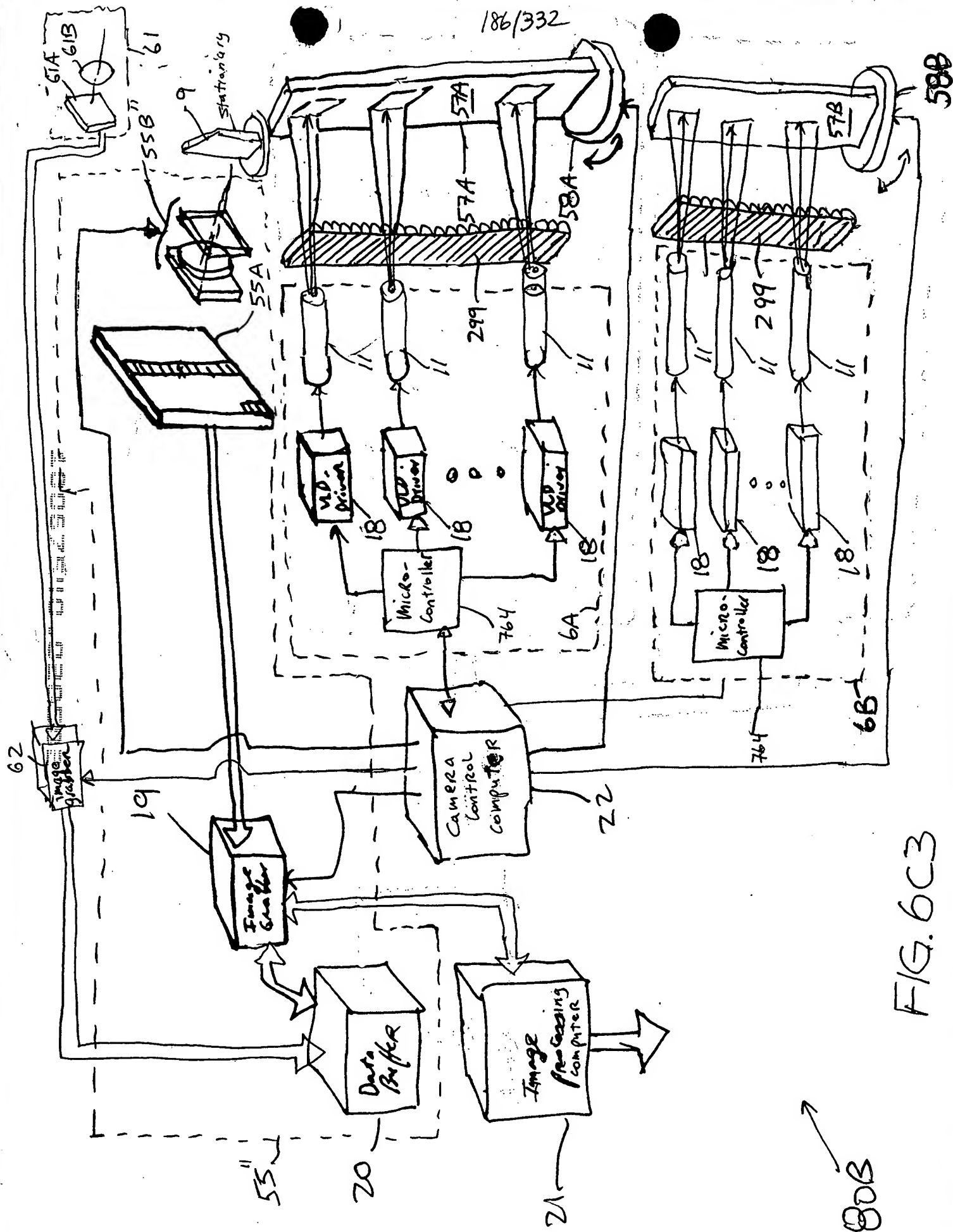


FIG. 6C3

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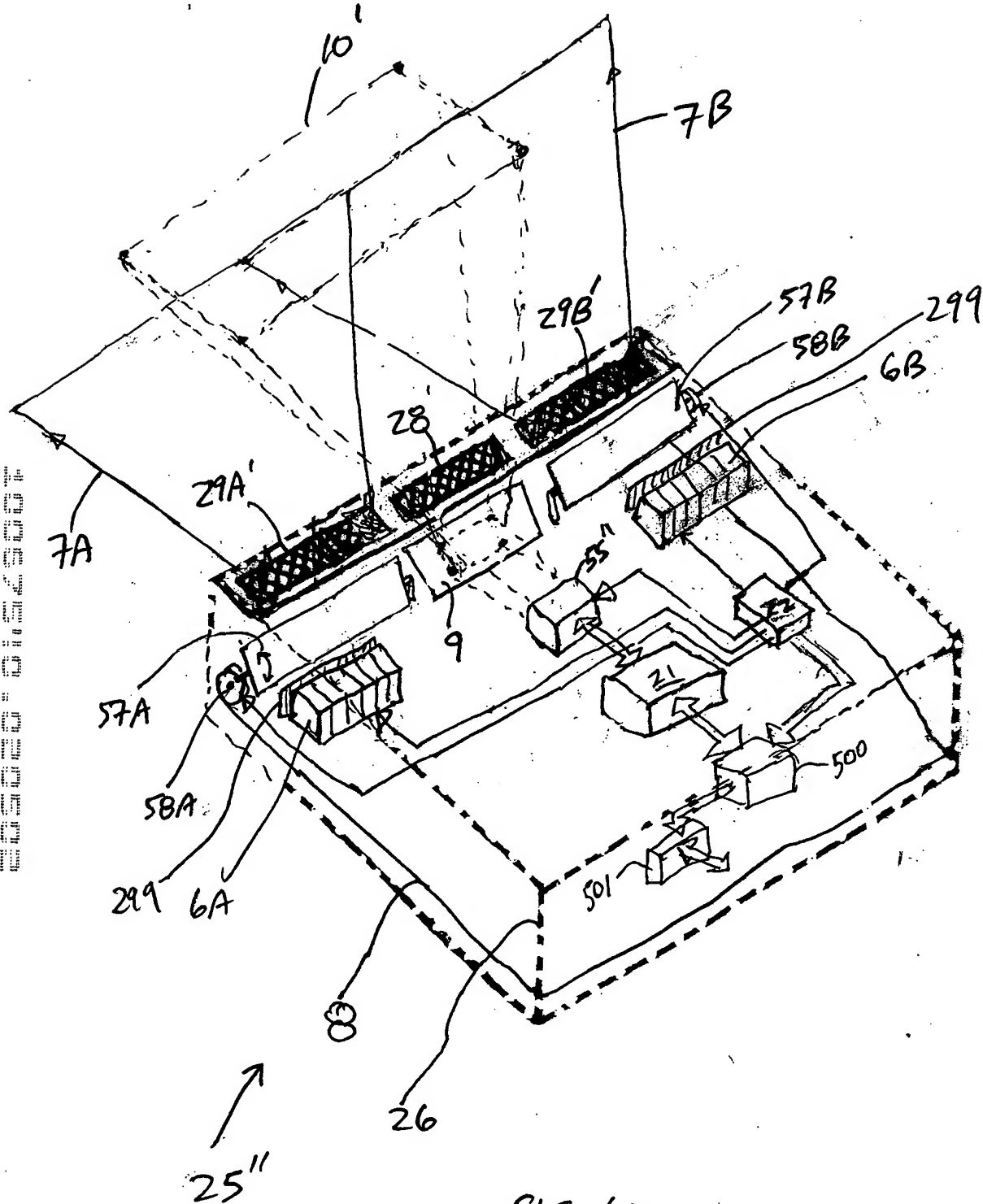


FIG. 6D1

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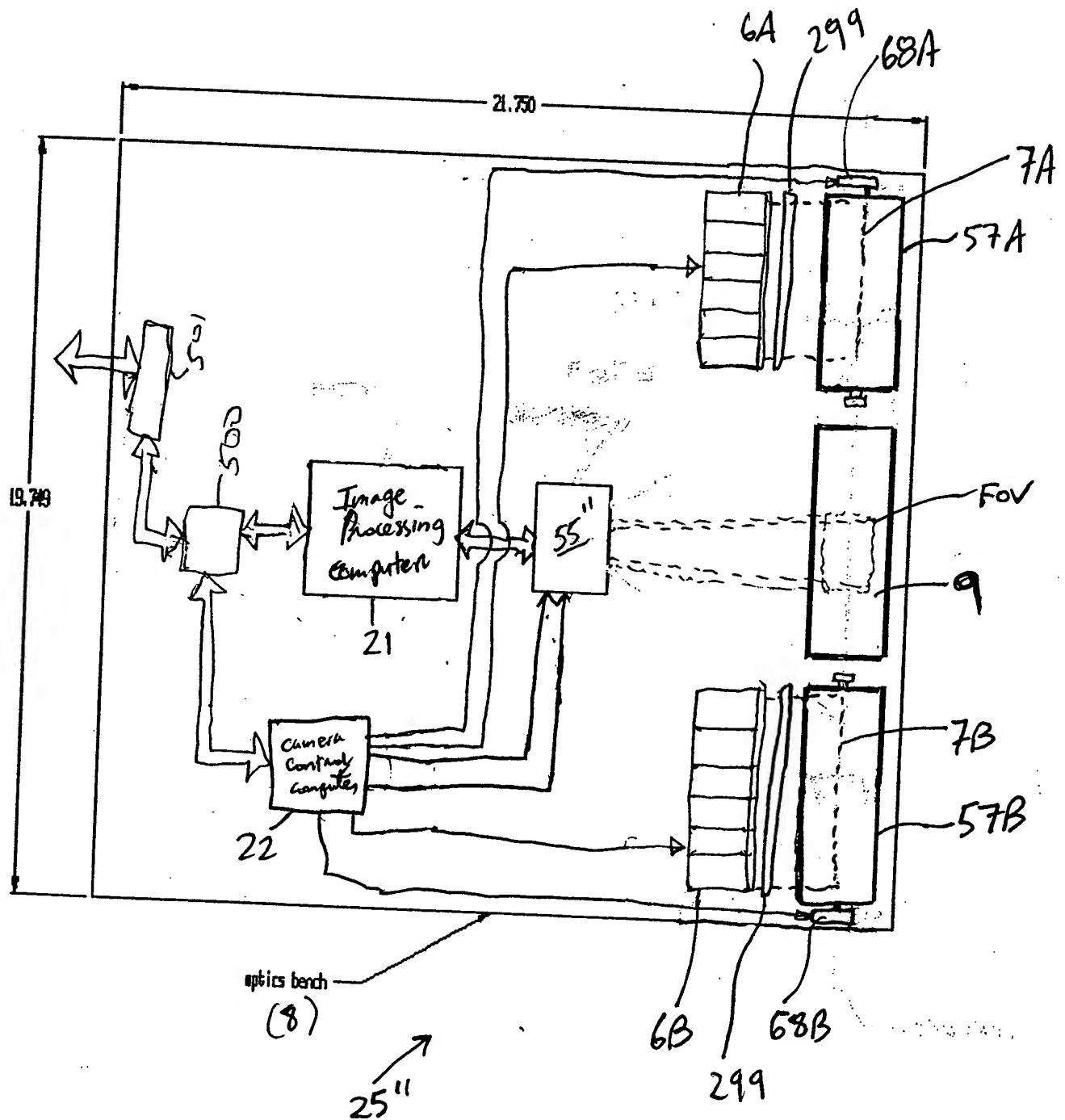


FIG. 6DZ

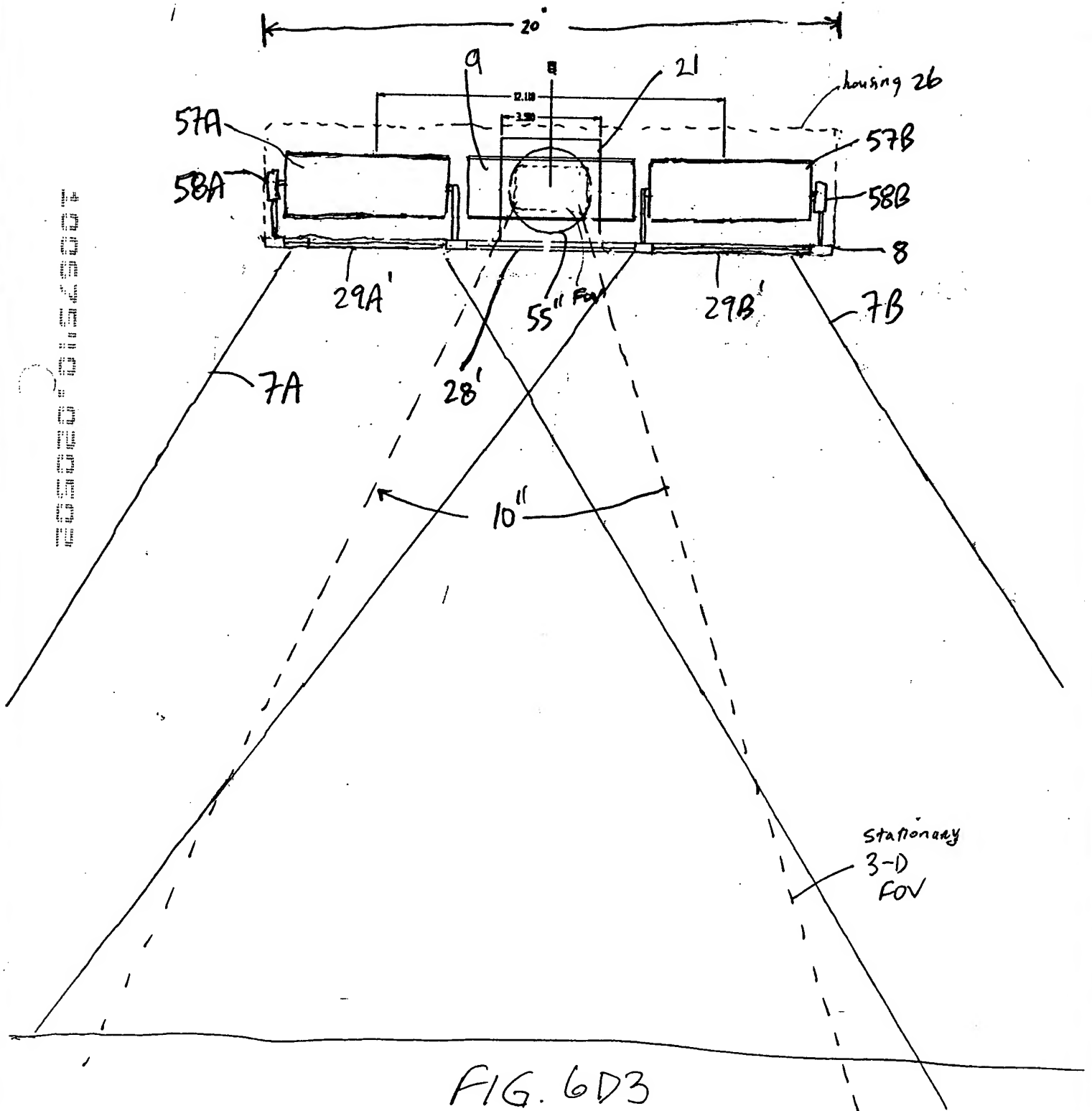


FIG. 6D3

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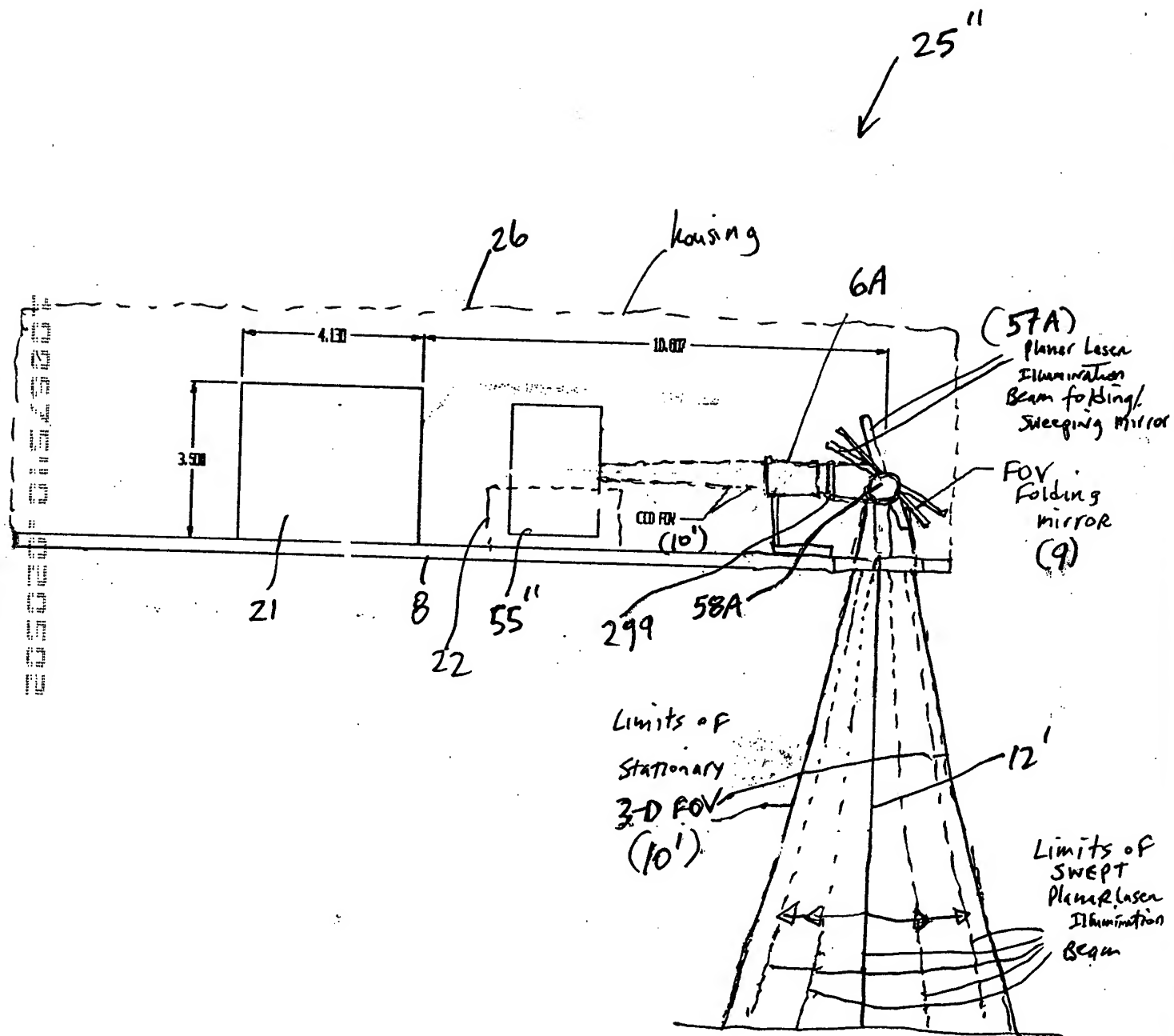


FIG. 6D4

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variable FOV

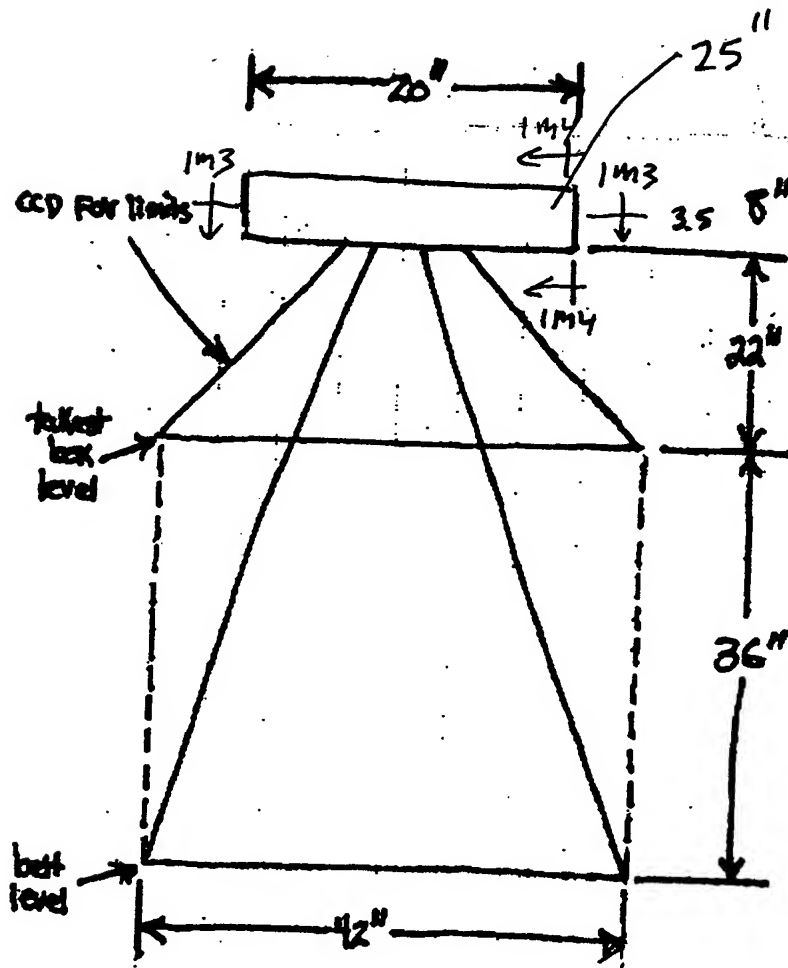


FIG. 6D5

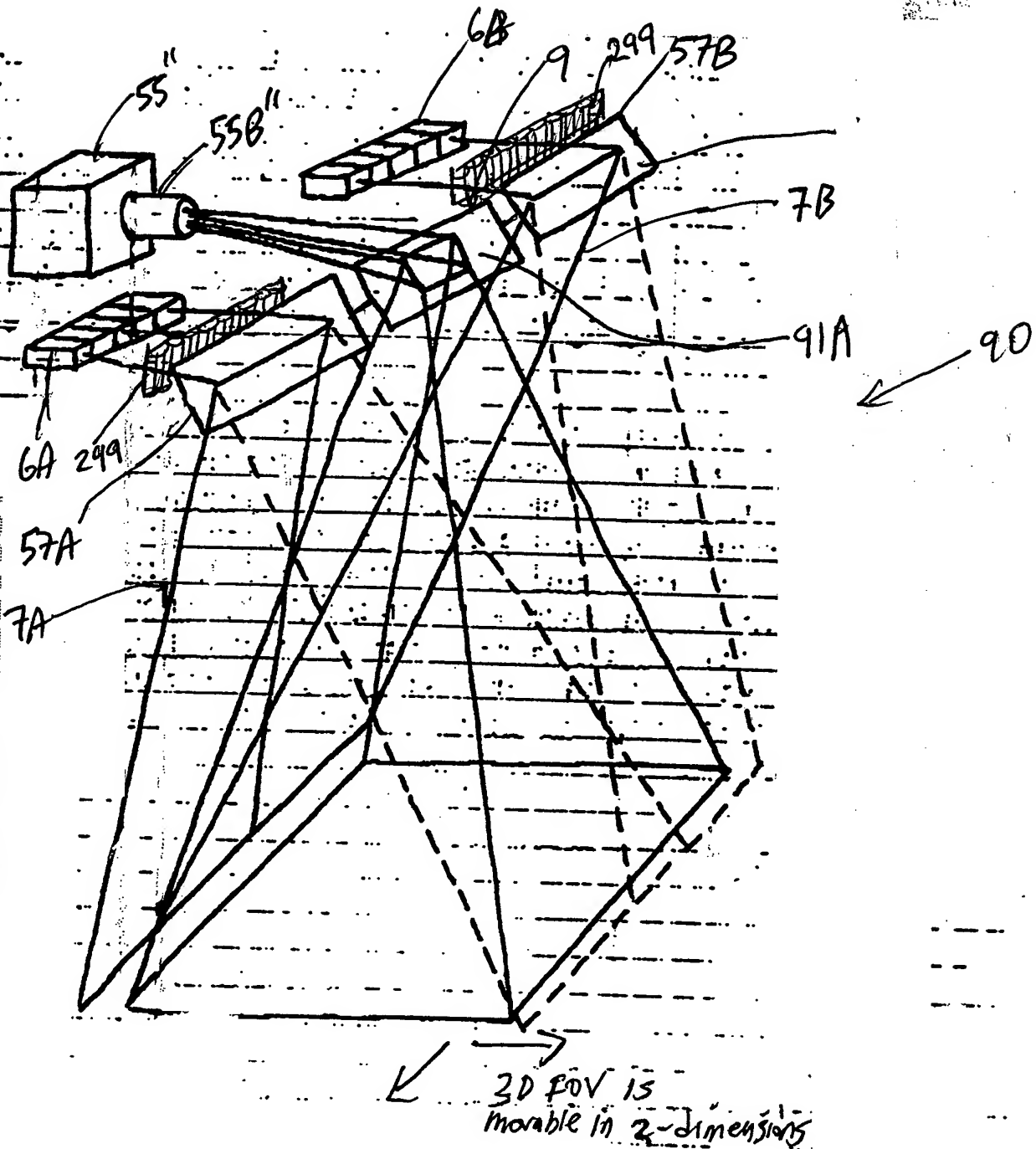


FIG 6E1

(1) Variable focal length camera lens
 (2) Variable fluid distance

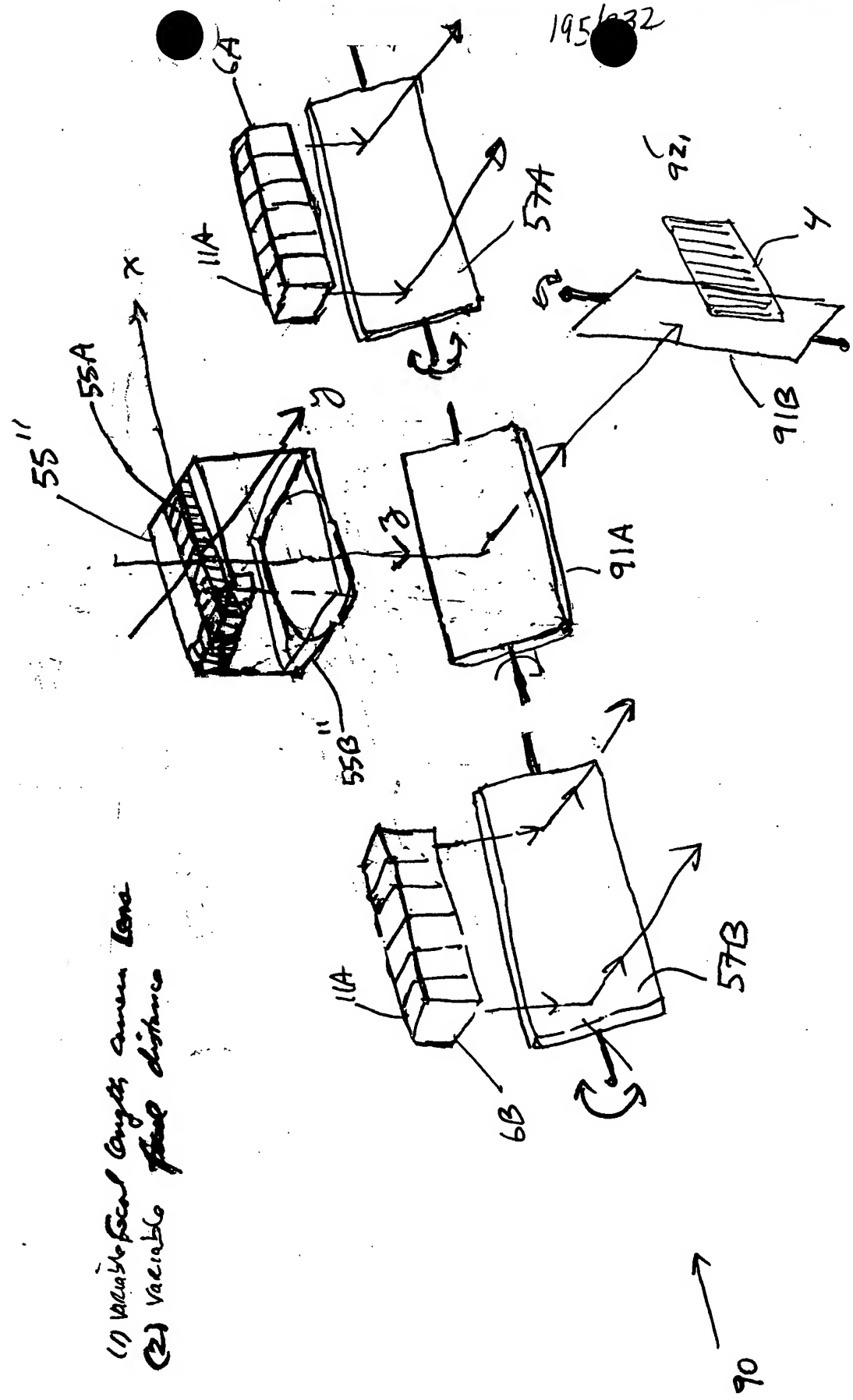
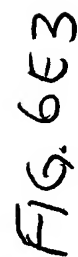


FIG. 6E2

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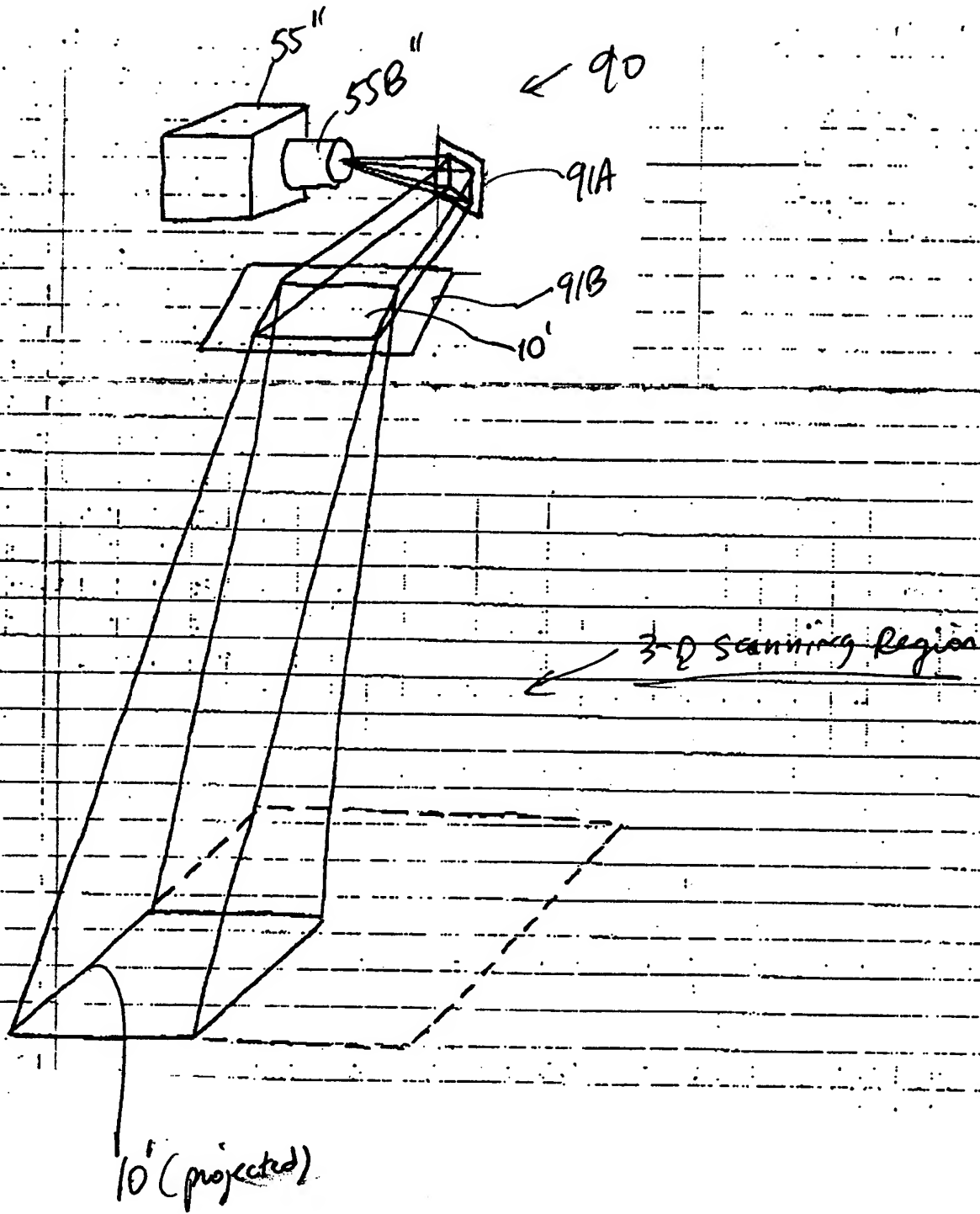
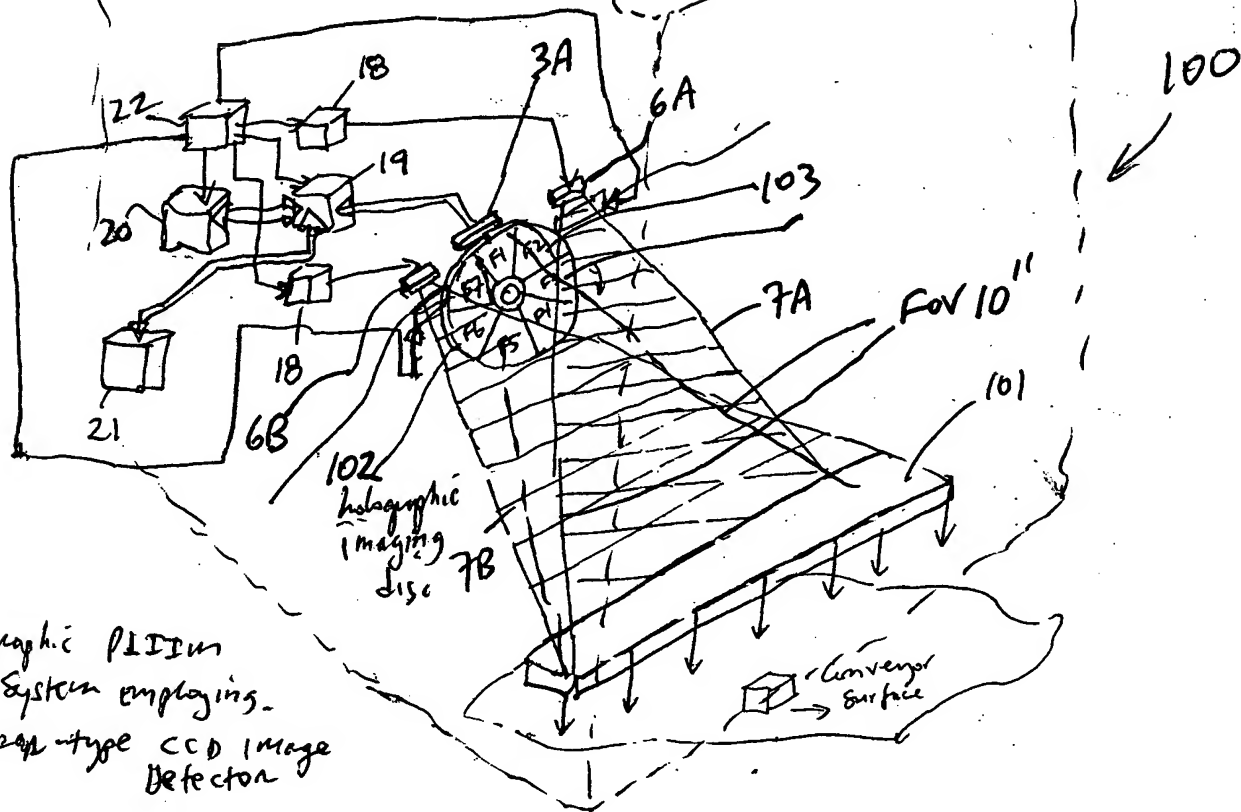


FIG. 6E4

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Holographic PIIIM
System employing
Linear-type CCD Image
Detector

FIG. 7A

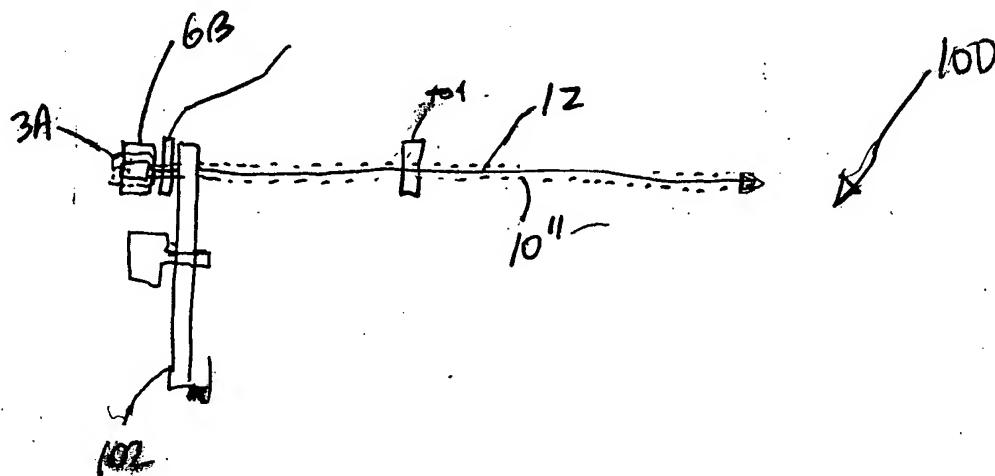
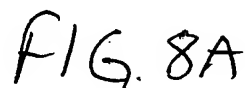


FIG. 7B

[illegible]

1-D CCD SCANNER EMBODIMENT

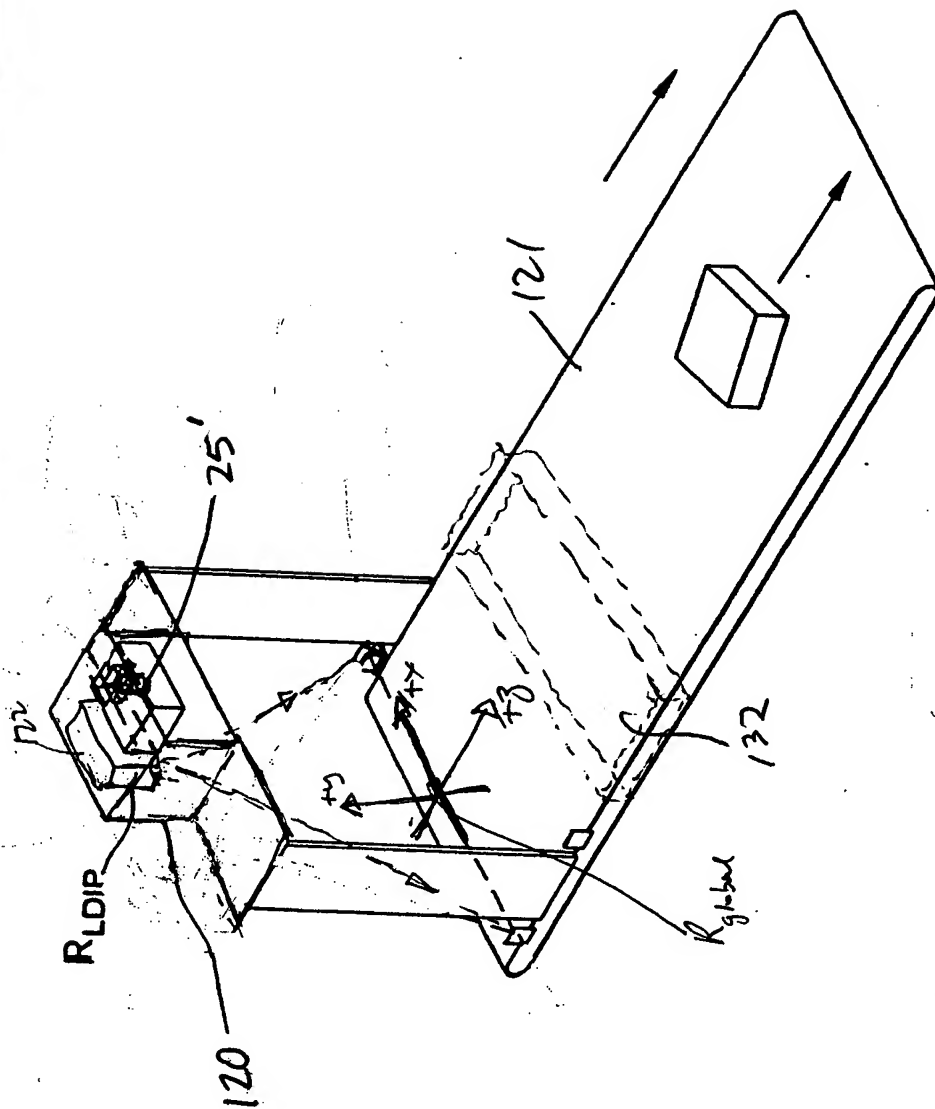


FIG. 9

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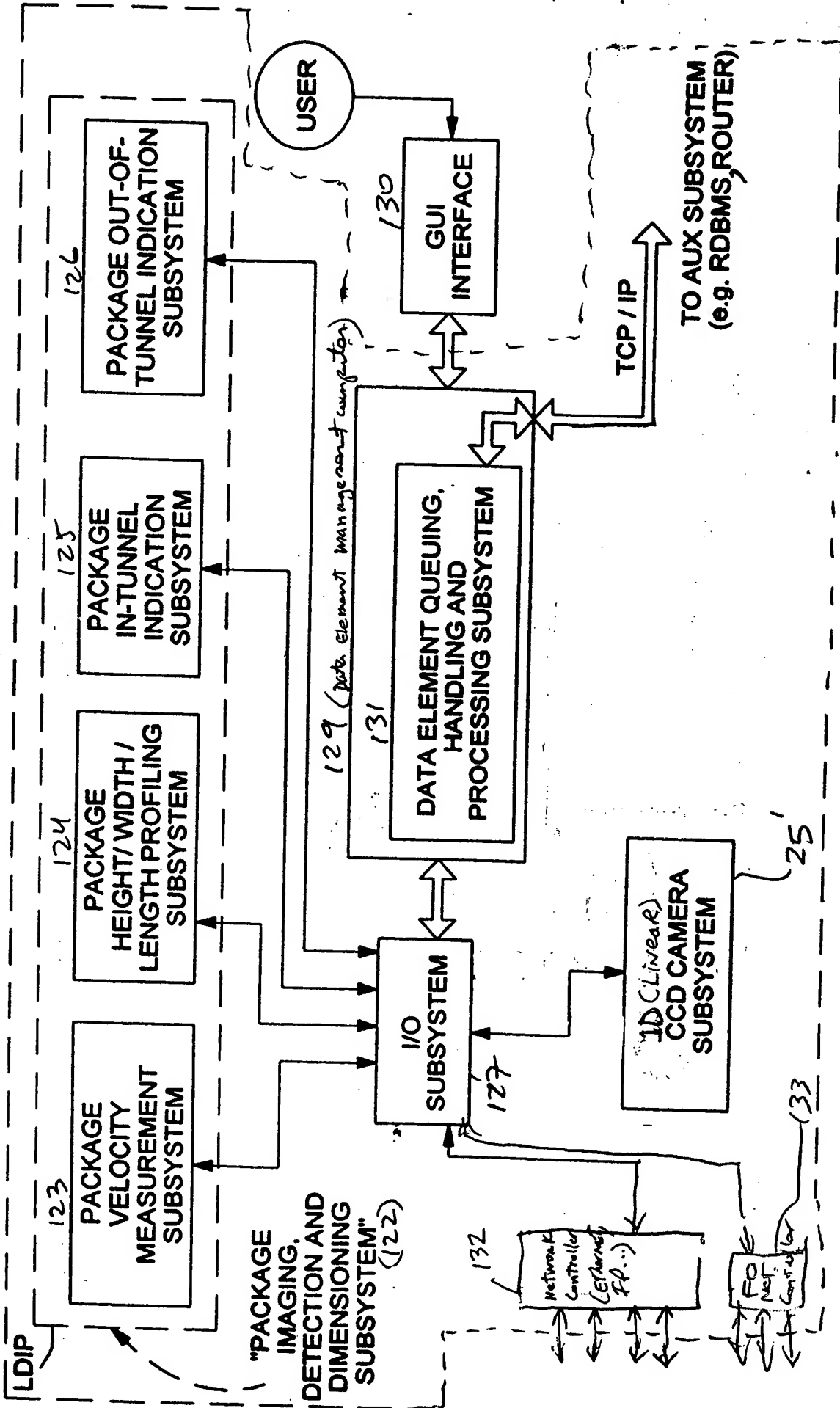


FIG. 10

120

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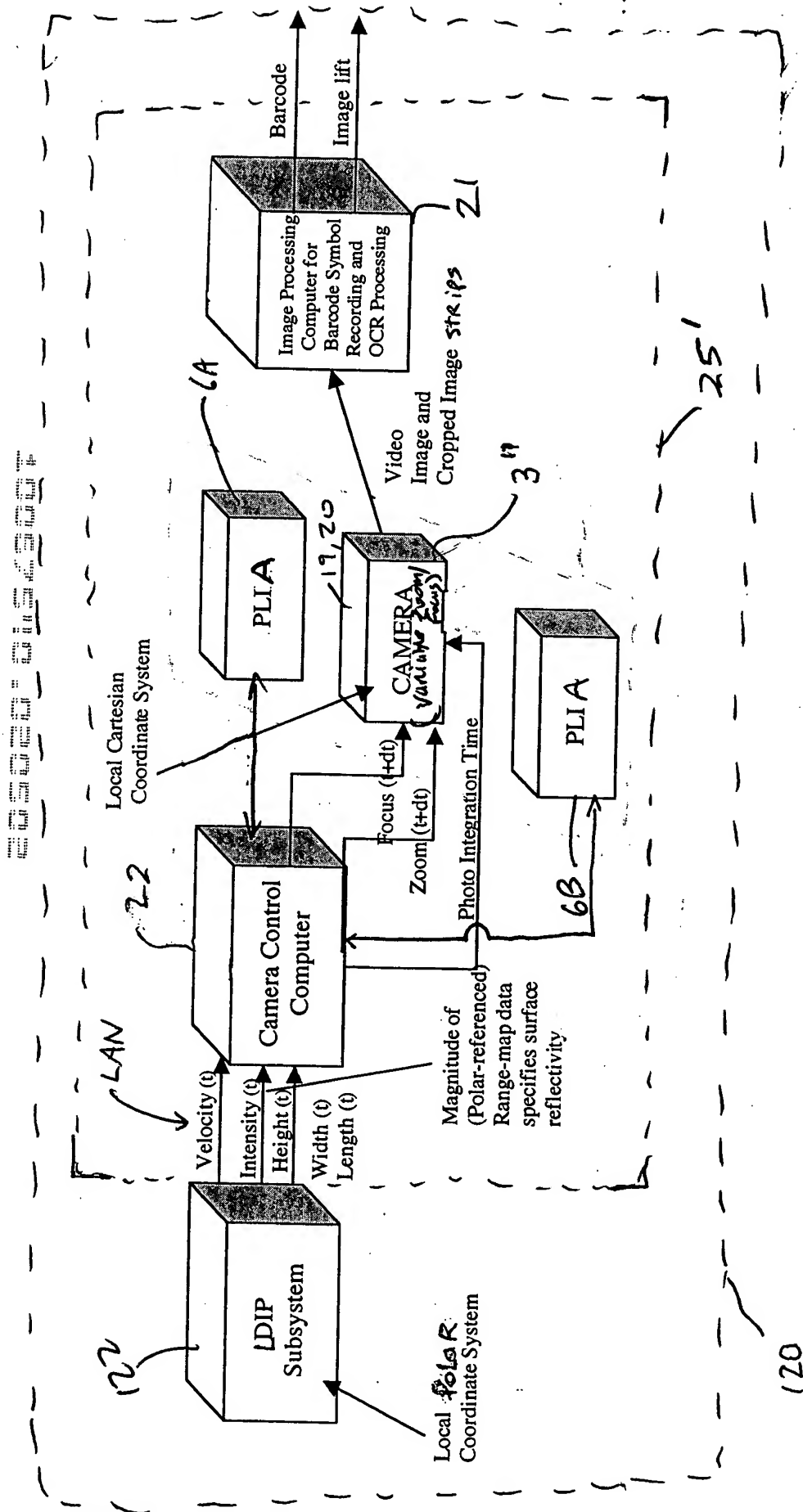


FIG. 11

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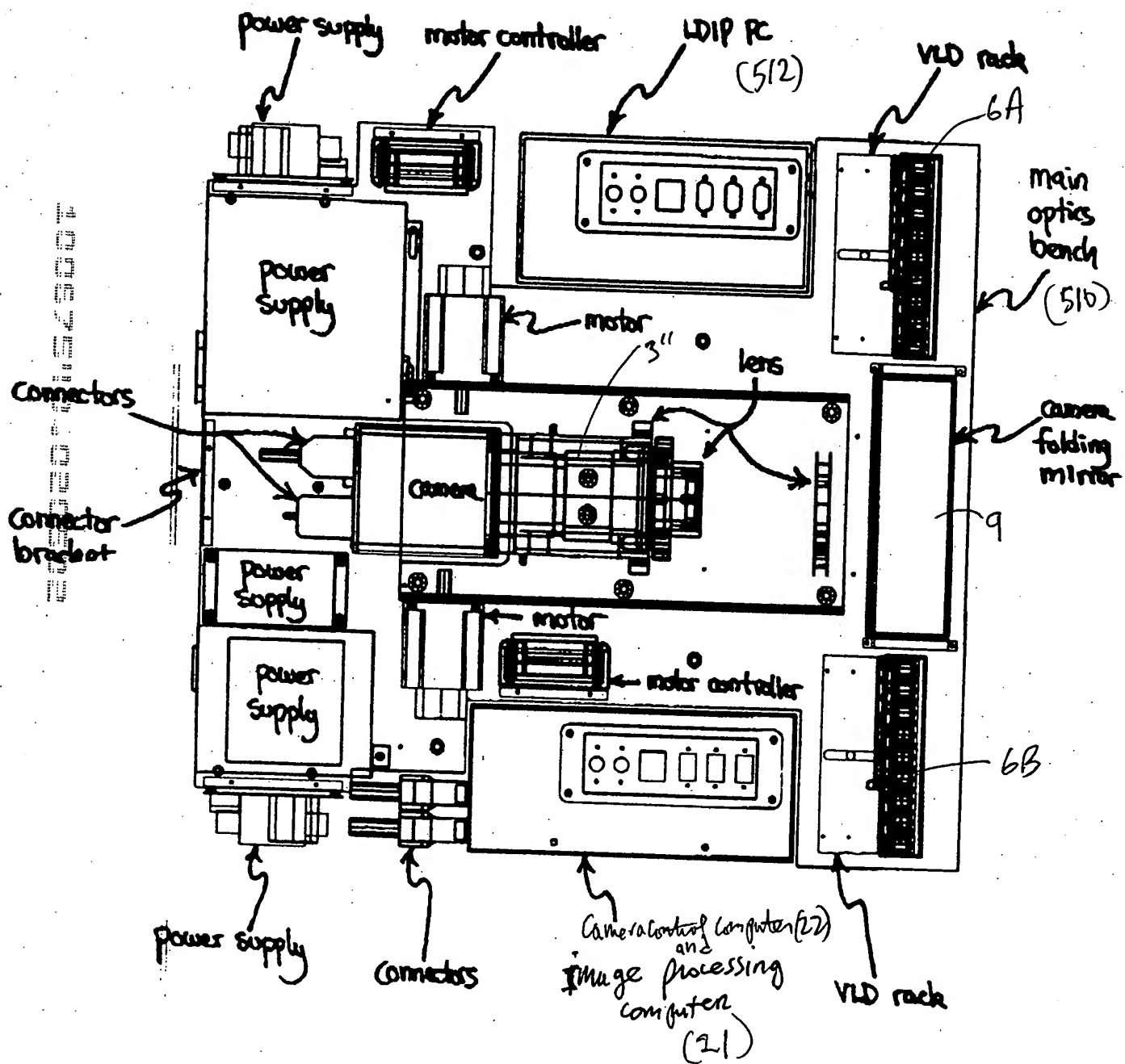


FIG. 12C

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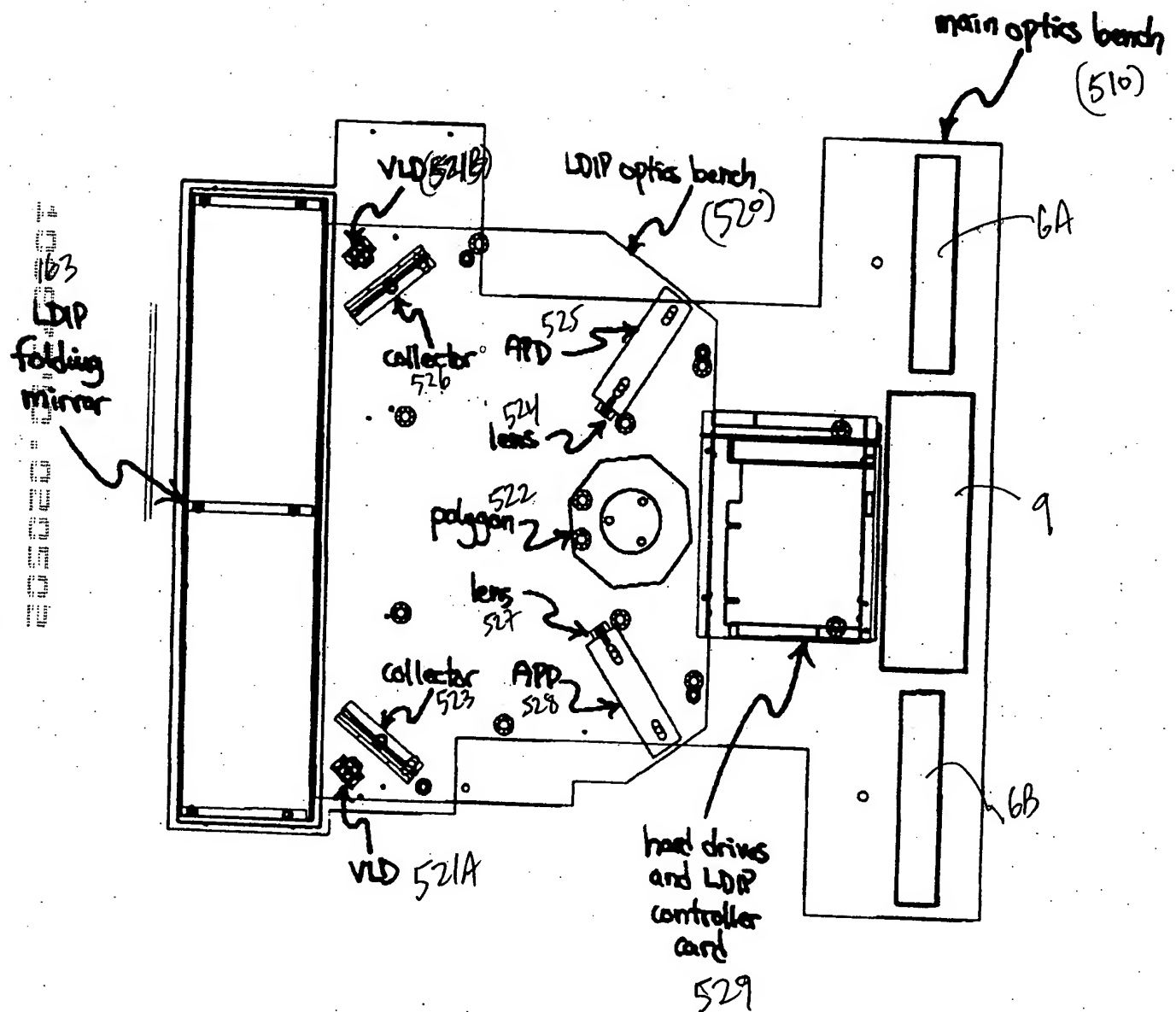
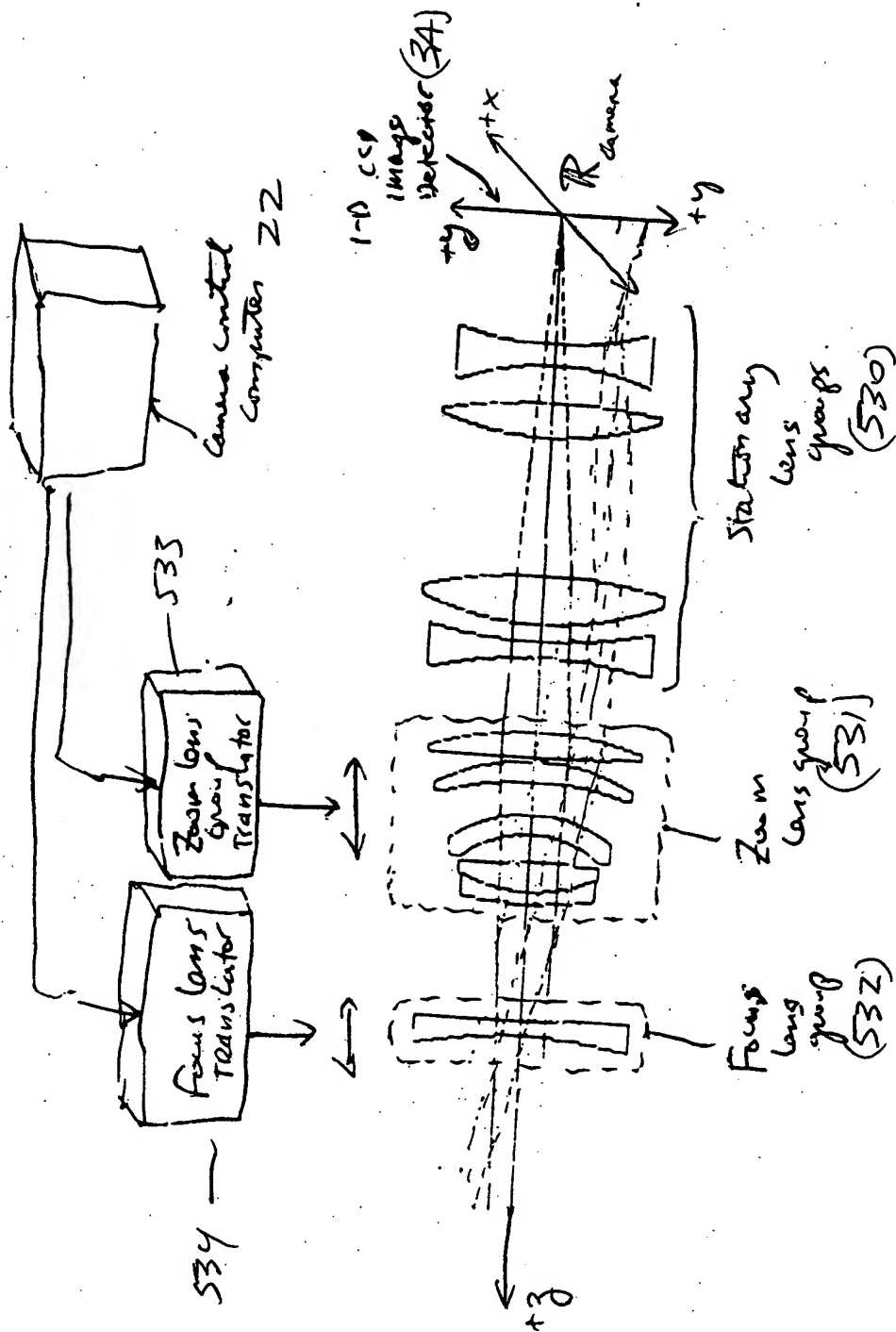


FIG. 12D

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(main optics)
(lens groups)

FIG. 12E



FIG. 13A

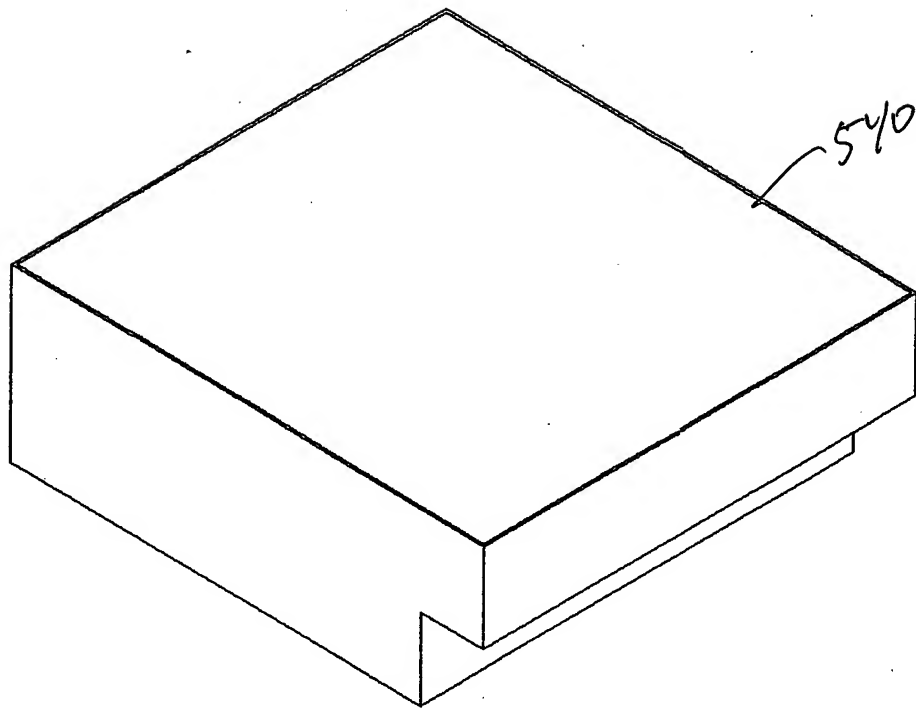


FIG. 13B

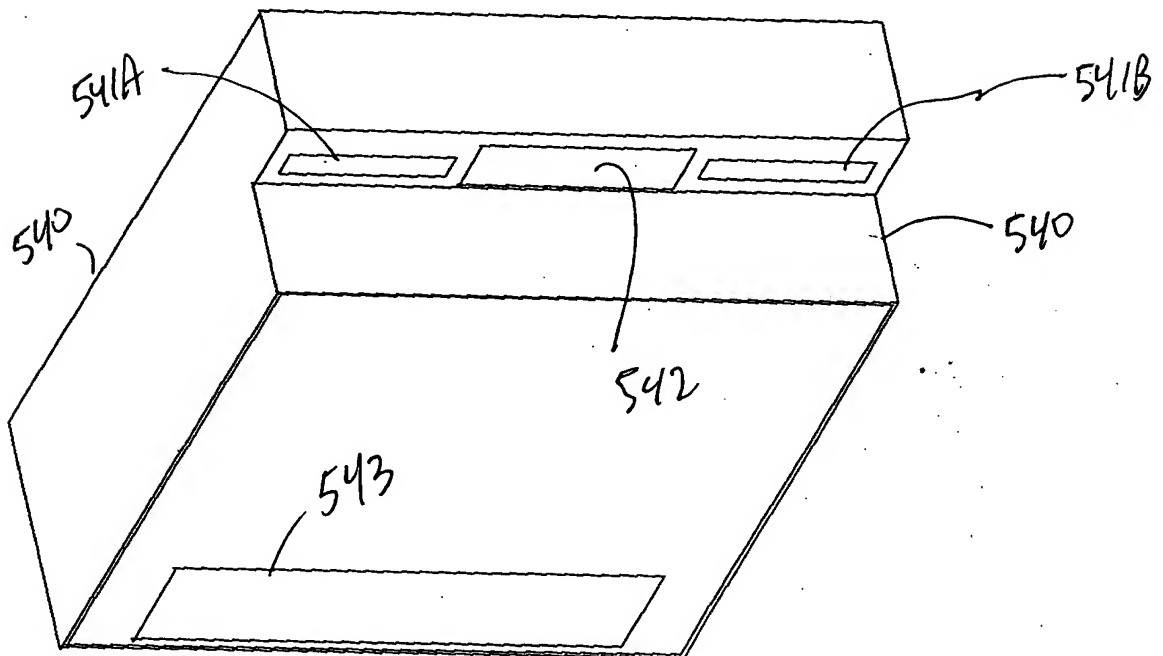


FIG. 13C

2022-01-25

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PLLIM-BASED PACKAGE IDENTIFICATION AND DIMENSIONING (PID) SYSTEM

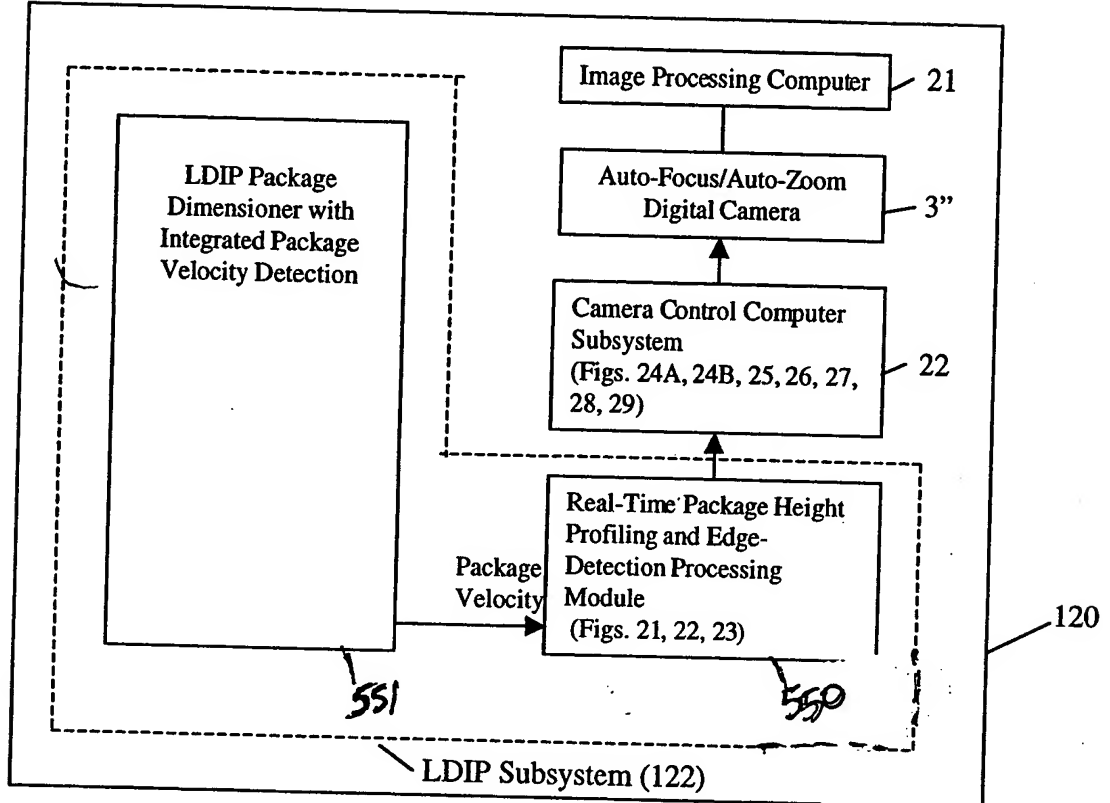


FIG. 14

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LDIP REAL-TIME PACKAGE HEIGHT PROFILE AND EDGE DETECTION METHOD

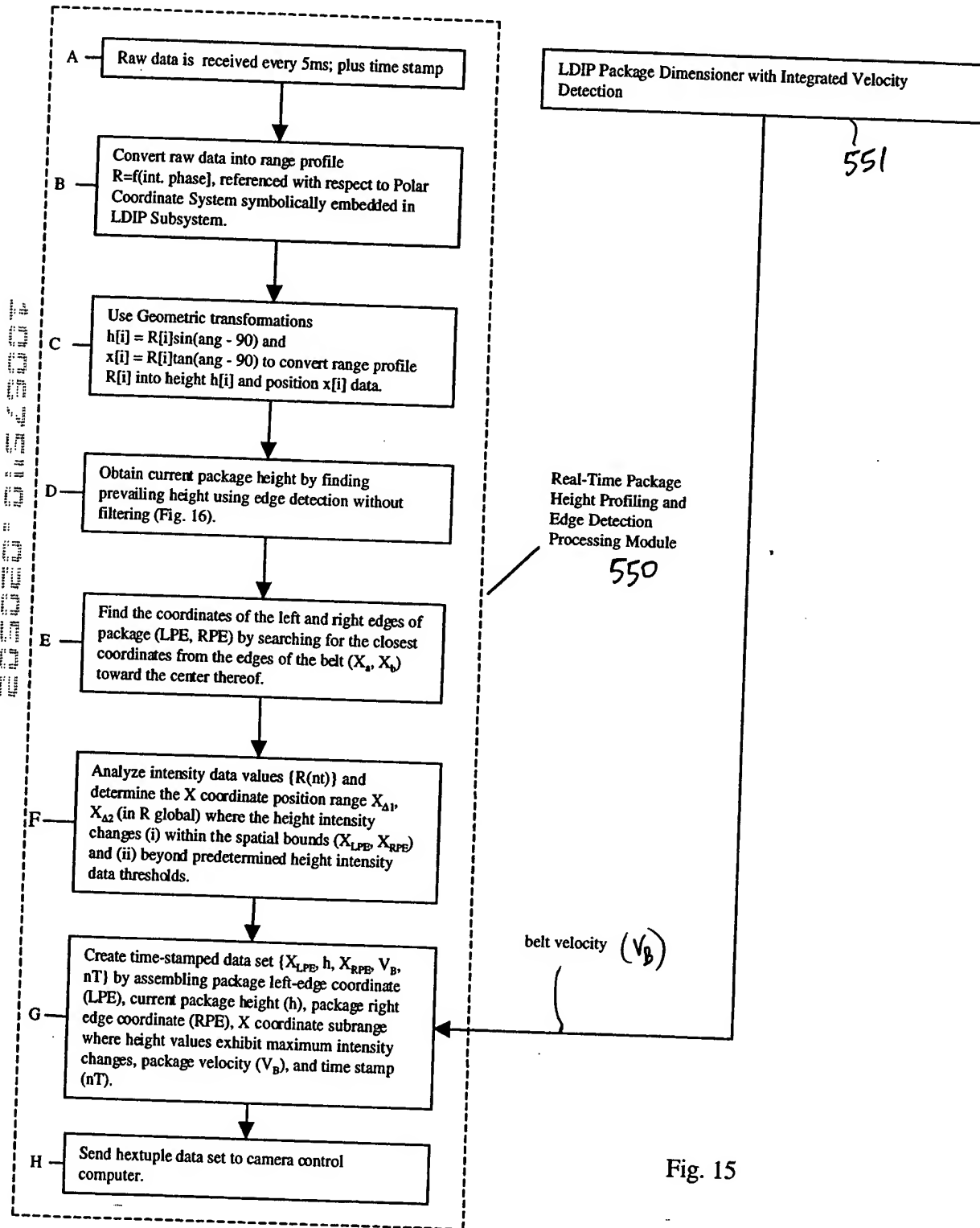


Fig. 15

LDIP Real Time Package Edge Detection

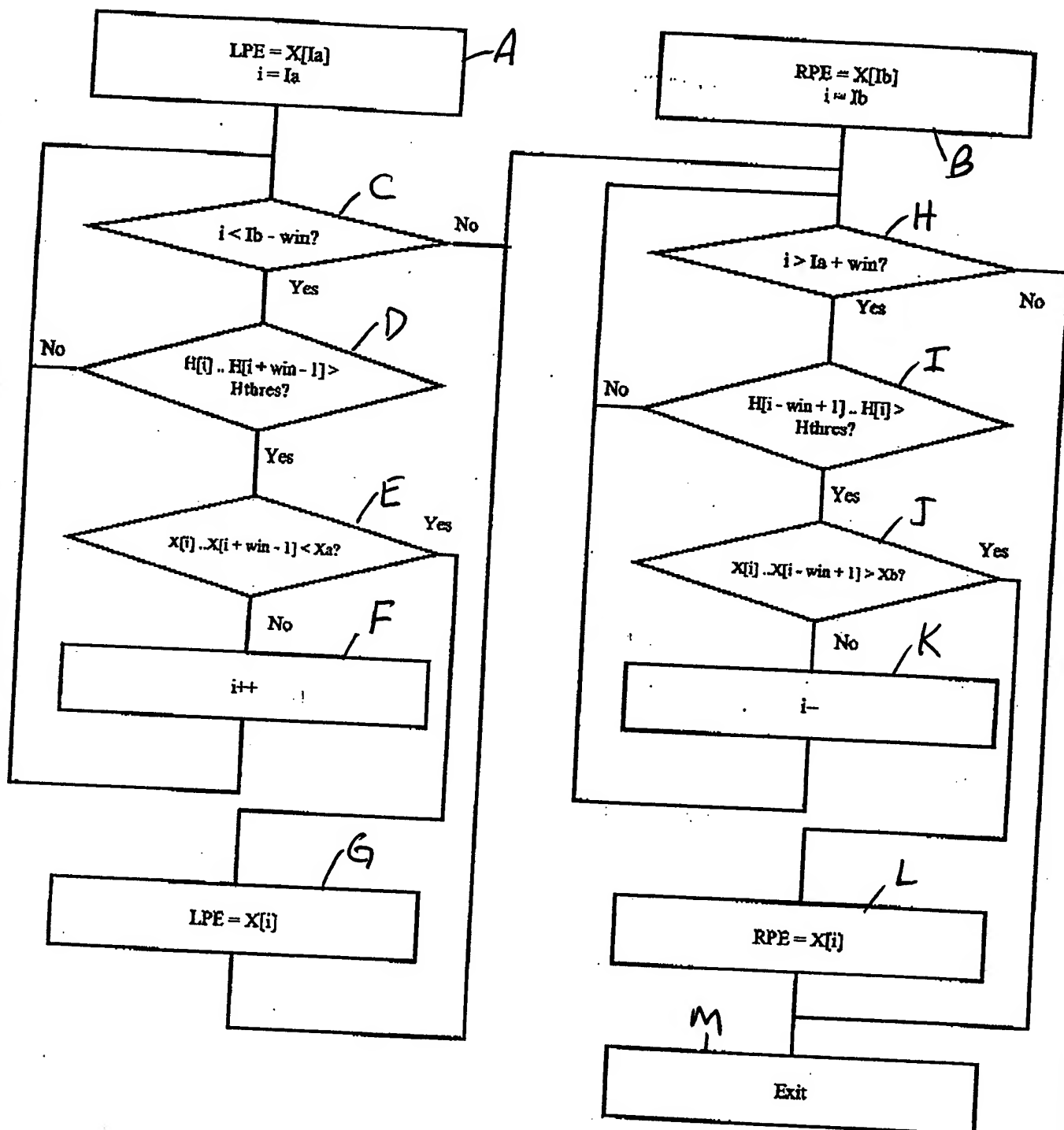


FIG. 16

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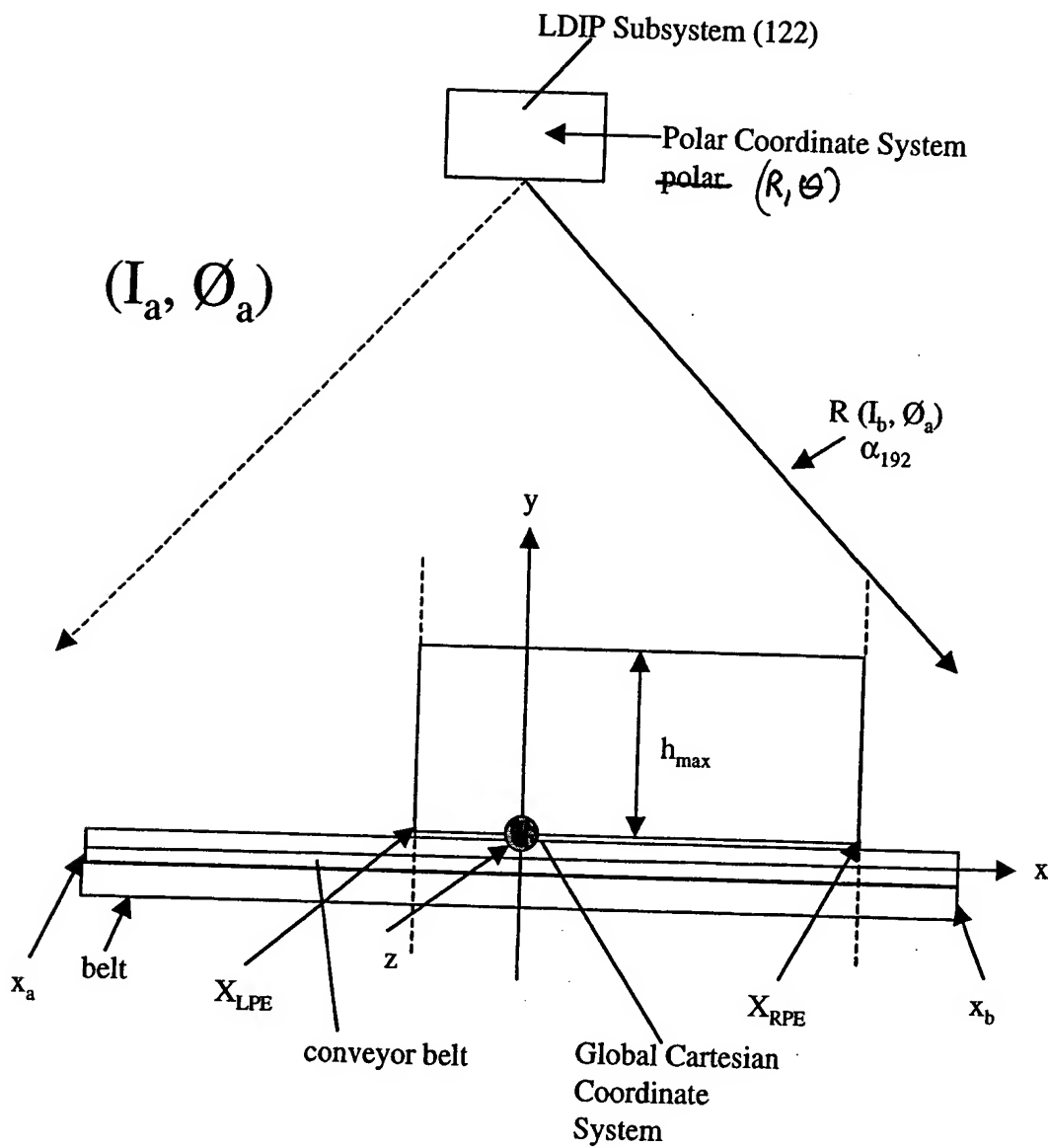


Fig. 17

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INFORMATION MEASURED AT SCAN ANGLES BEFORE COORDINATE TRANSFORMS

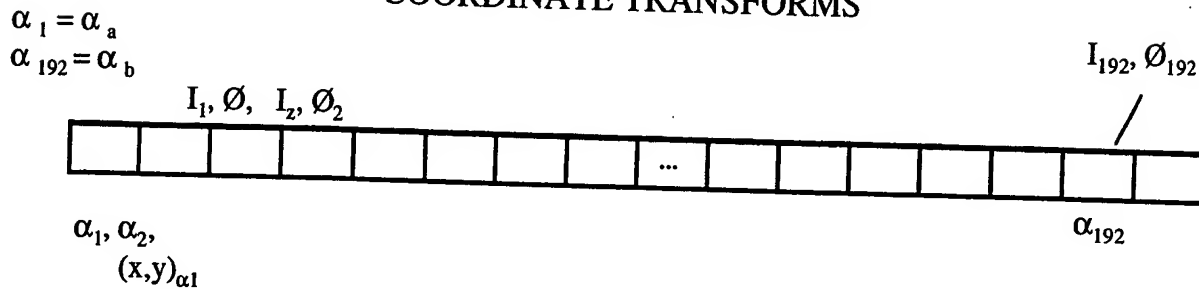


Fig. 17A

RANGE AND POLAR ANGLE MEASURES TAKEN AT SCAN ANGLE α BEFORE COORDINATE TRANSFORMS

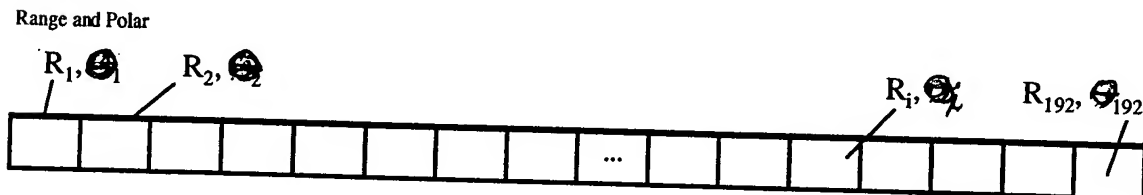


Fig. 17B

MEASURED PACKAGE HEIGHT AND POSITION VALUES AFTER COORDINATE TRANSFORMS

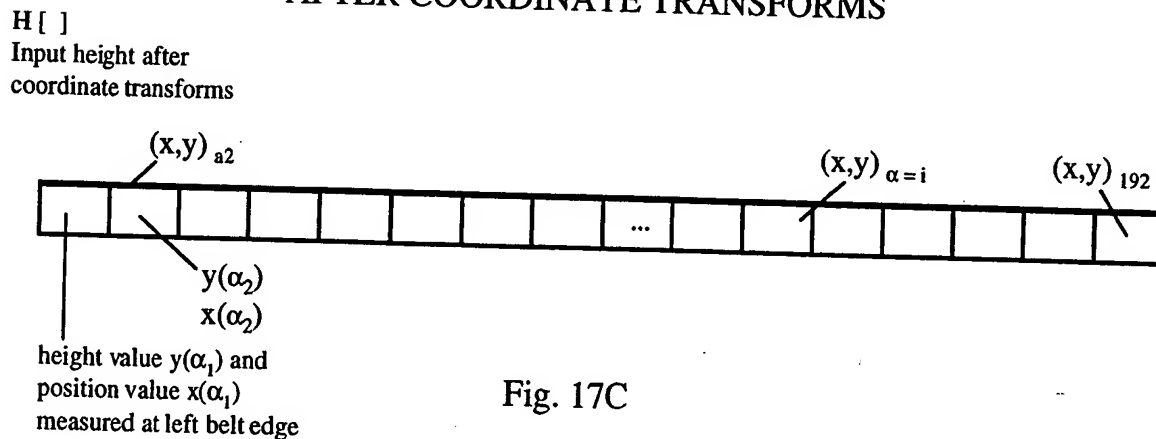


Fig. 17C

CAMERA CONTROL PROCESS CARRIED OUT WITHIN THE CAMERA CONTROL SUBSYSTEM OF EACH OBJECT ATTRIBUTE ACQUISITION AND ANALYSIS SYSTEM

560

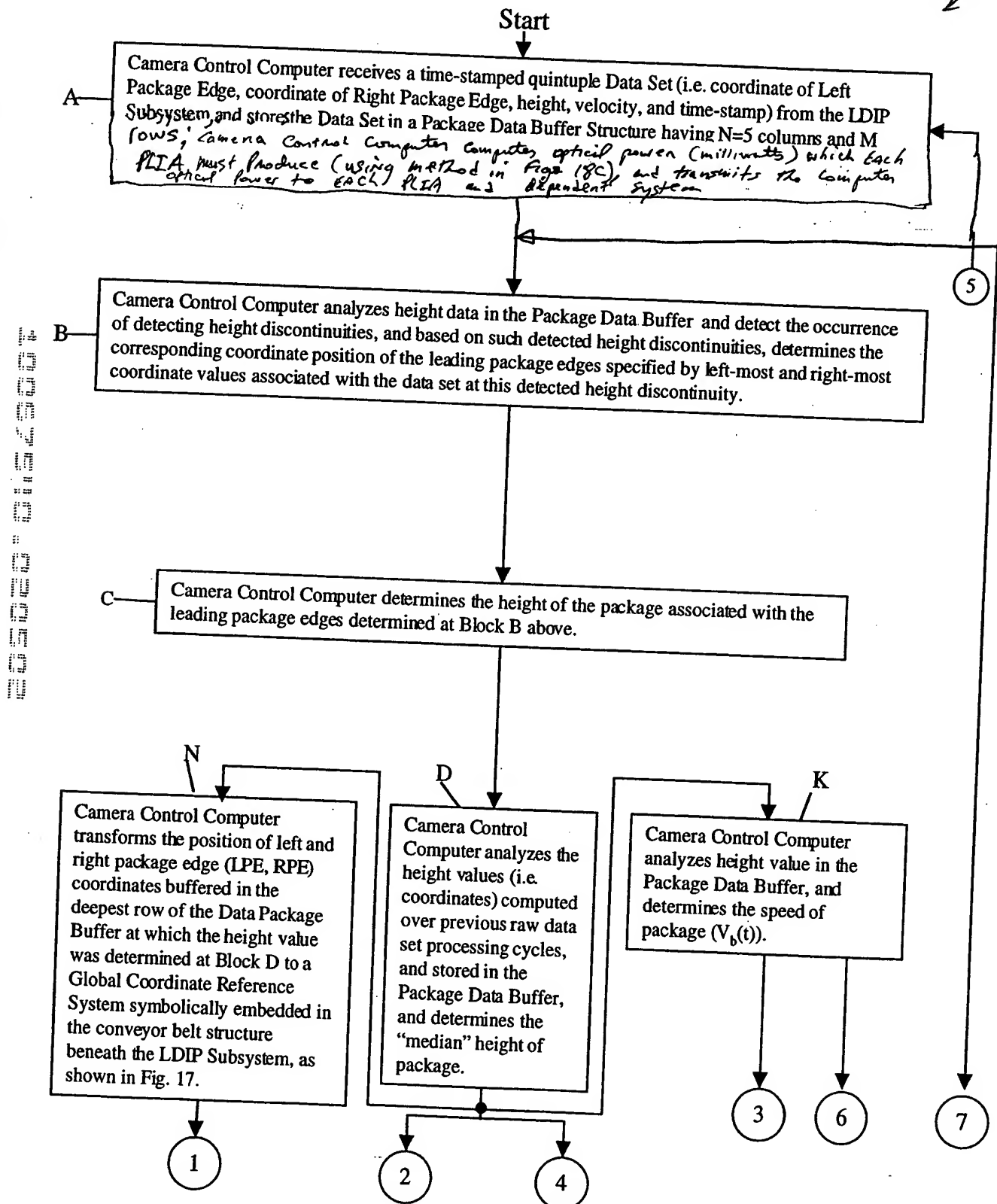


Fig. 18A

216/332.

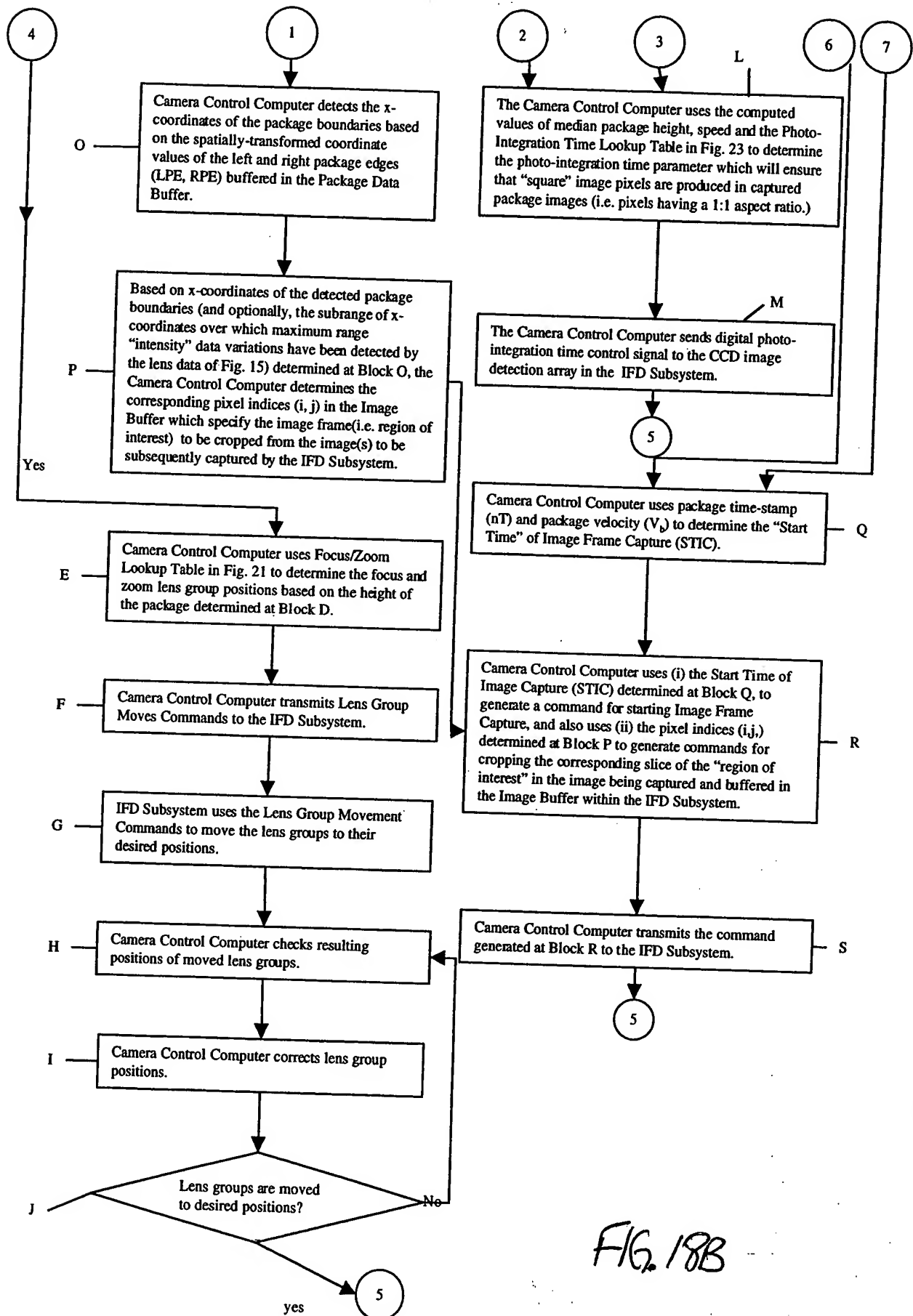


FIG. 18B

A

Computer Line Rate of Linear LCD Sensor (dots/sec) based on computed belt velocity (inches/sec) and constant image resolution (dots/inch) desired, using equation:

$$\text{line rate} = (\text{belt velocity}) \times (\text{image resolution})$$

B

Computer photointegration time ΔT of the linear image sensor based on computed line rate using the formula:

$$\text{photointegration time} = 1/\text{line rate}$$

A

Fig. 18C1

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Compute optical power (milliwatts) of each PLIA based on computed photointegration time (ΔT) using the following formula:

$$\text{optical power of LD (milliwatts)} = \frac{\text{constant}}{\text{photointegration time } \Delta T}$$

Fig. 18C2

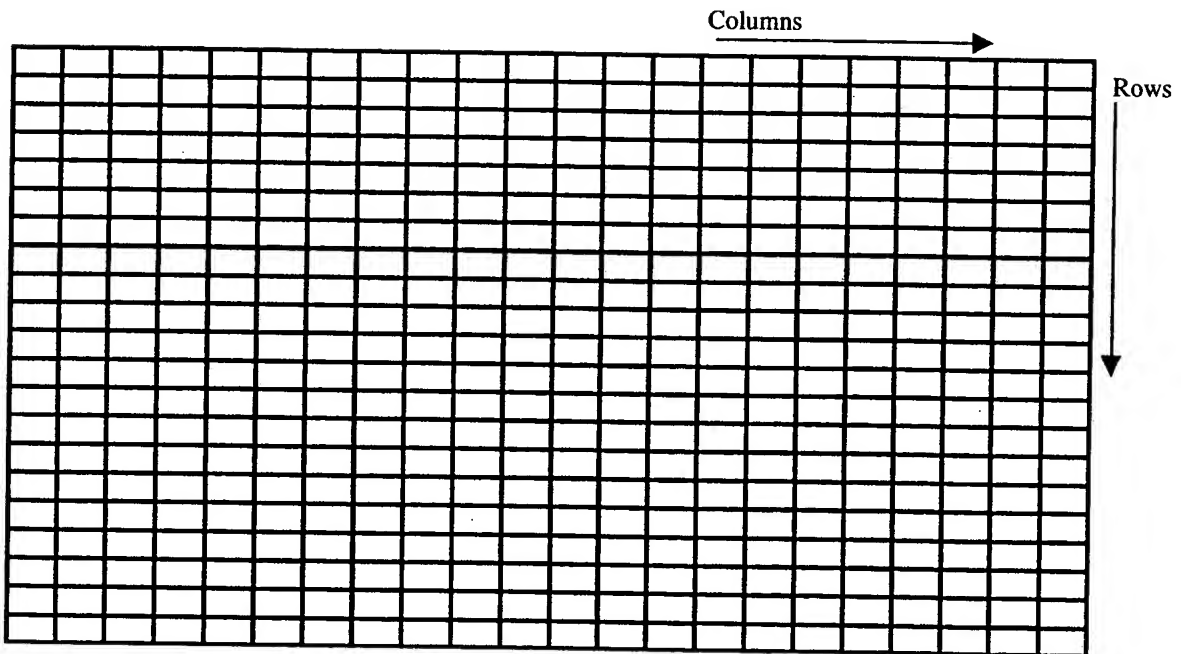
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X coordinate subrange where
maximum range "intensity"
variations have been detected

Left Package Edge (LDE)	Package Height (h)	Right Package Edge (RPE)	Package Velocity	Time-stamp (nT)	
					Row 1
					Row 2
					Row 3
					Row 4
					Row 5
					Row M

Package Data Buffer (FIFO)

Fig. 19



Camera Pixel Data Buffer
pixel indices (i,j)

Fig. 20

60500 012300

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Zoom and Focus Lens Group Position
Look-up Table

Distance from Camera H (mm)	Zoom group distance (mm) Y (Zoom)	Focus group distance (mm) Y (Focus)
1000	21.57489228	2.47E-05
1100	19.38089696	10.99009783
1200	17.10673434	20.65783177
1300	14.77137314	29.10917002
1400	12.39153565	36.47312595
1500	9.979114358	42.87845436
1600	7.540639114	48.44003358
1700	5.078794775	53.25495831
1800	2.595989366	57.40834303
1900	0.099972739	60.98883615

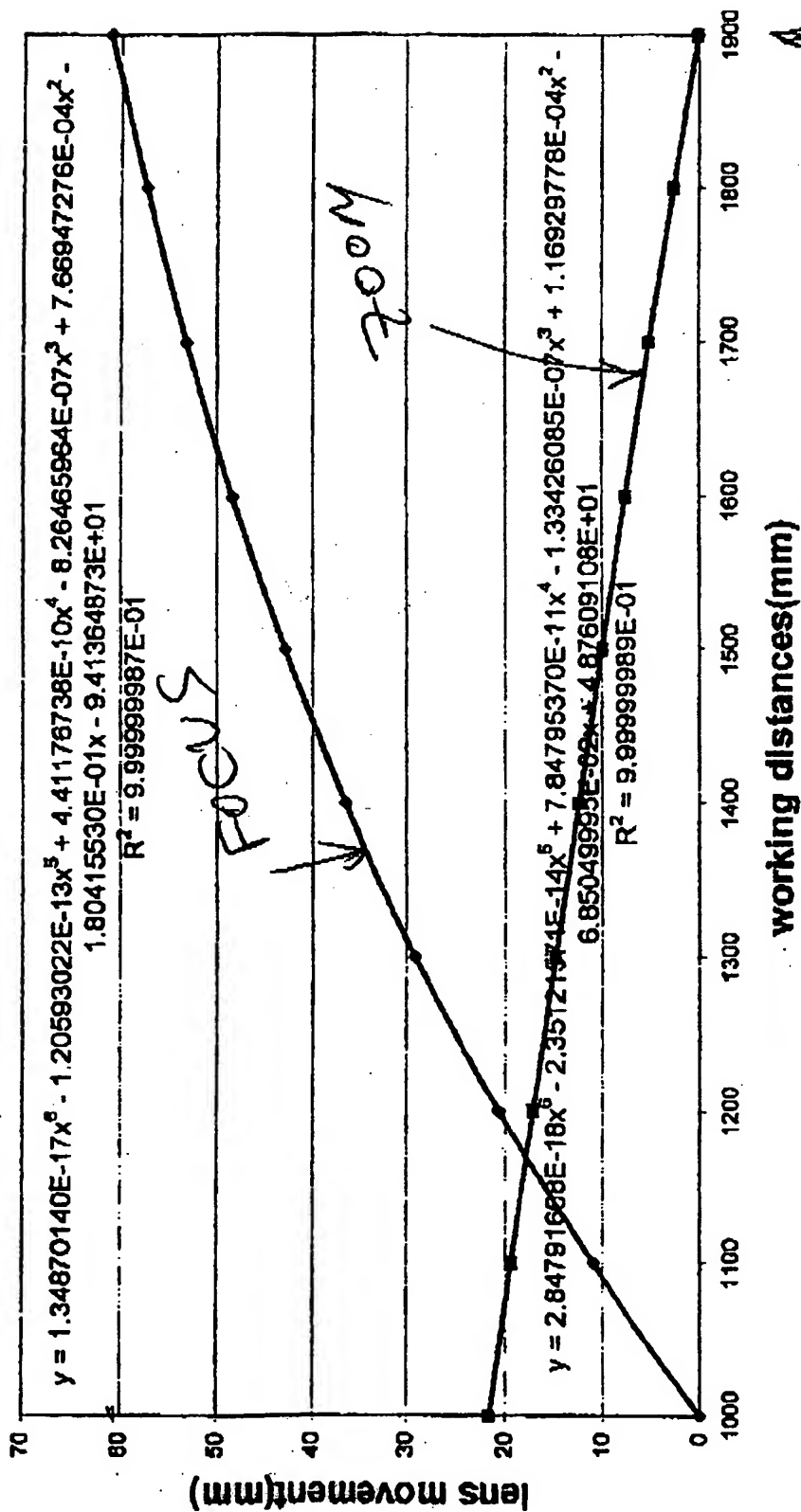
(Use interpolation techniques for walking distances between listed points in Table)

FIG. 21

* Note: the focal distance of Zeon (eff. focal length) of common cars are coupled (inter-dependent) in this concerned embodiment. Camera has a ~~very~~ focal constraint.

~~fixed~~ aperture F56

Focus and Zoom lens movement vs. working distances



t (inches)

26 above conveyor belt

← Package height above conveyor

conveyor-belt
surface

Fig 22

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600 feet per minute
(FPM)

20000 01525004 Photo-Integration Time Look-up Table

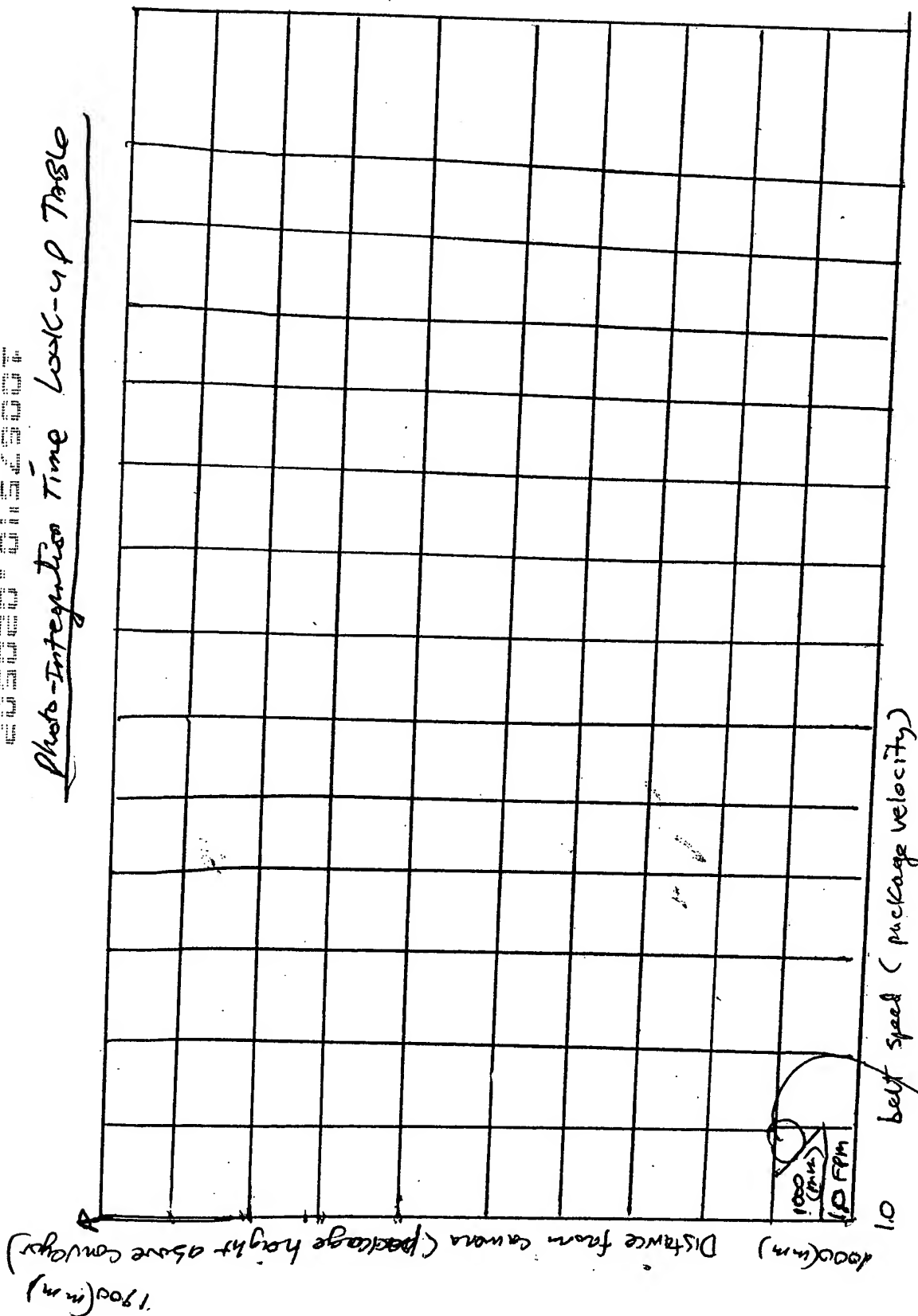


FIG. 23

Photo-integration
time value that
ensures square image pixels
(1:1 aspect ratio)

2000011323007

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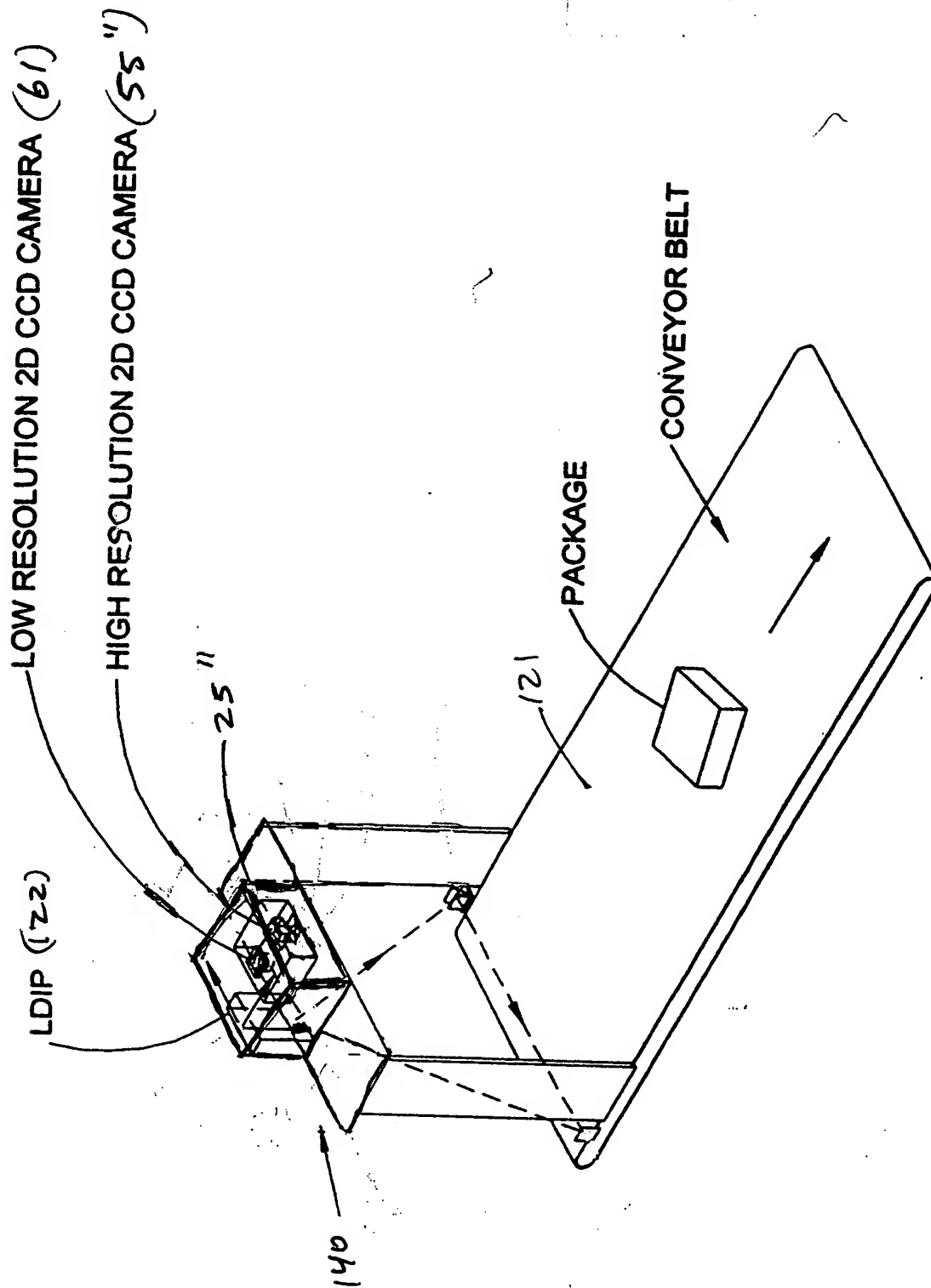


FIG 24

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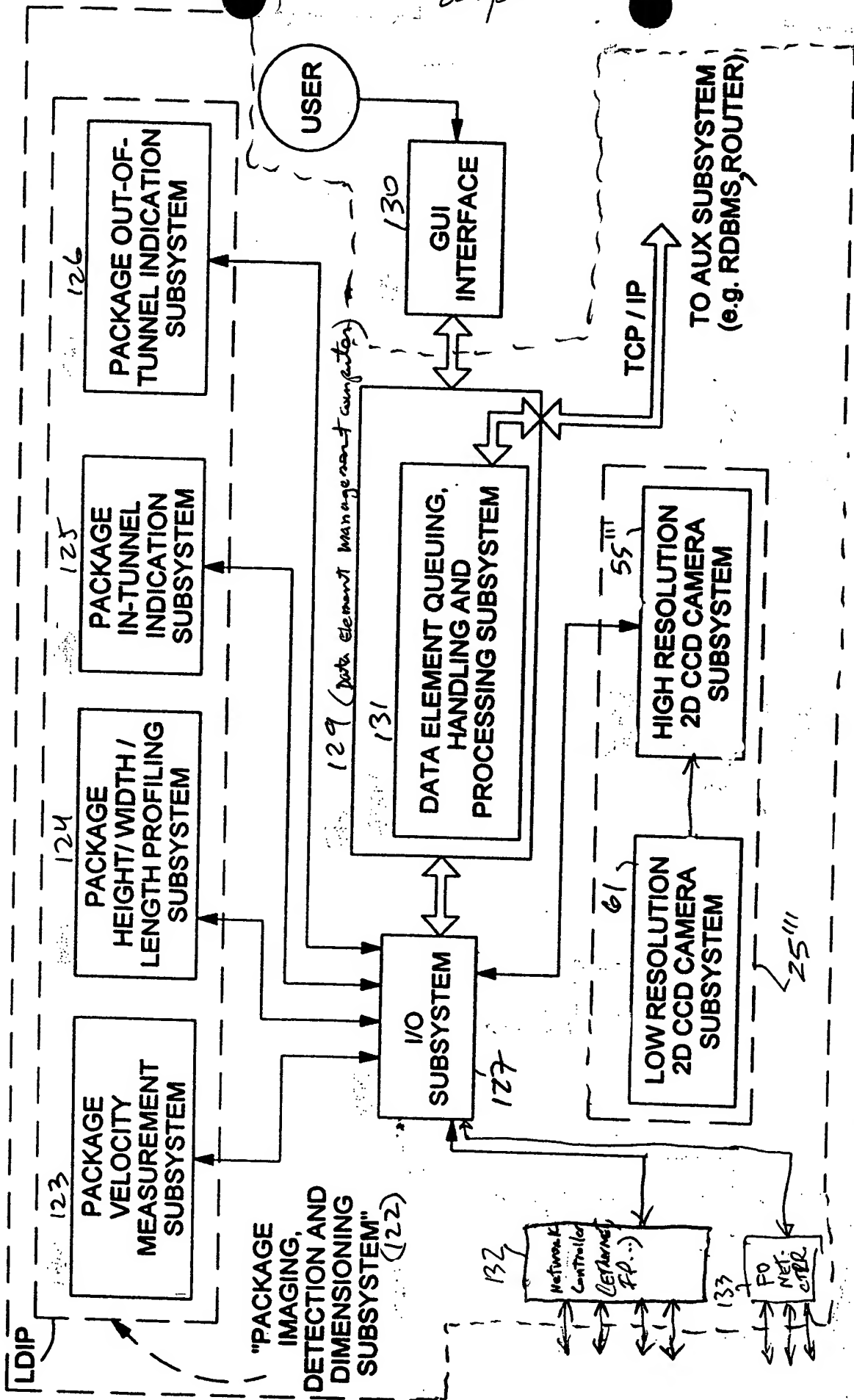


FIG. 25

140

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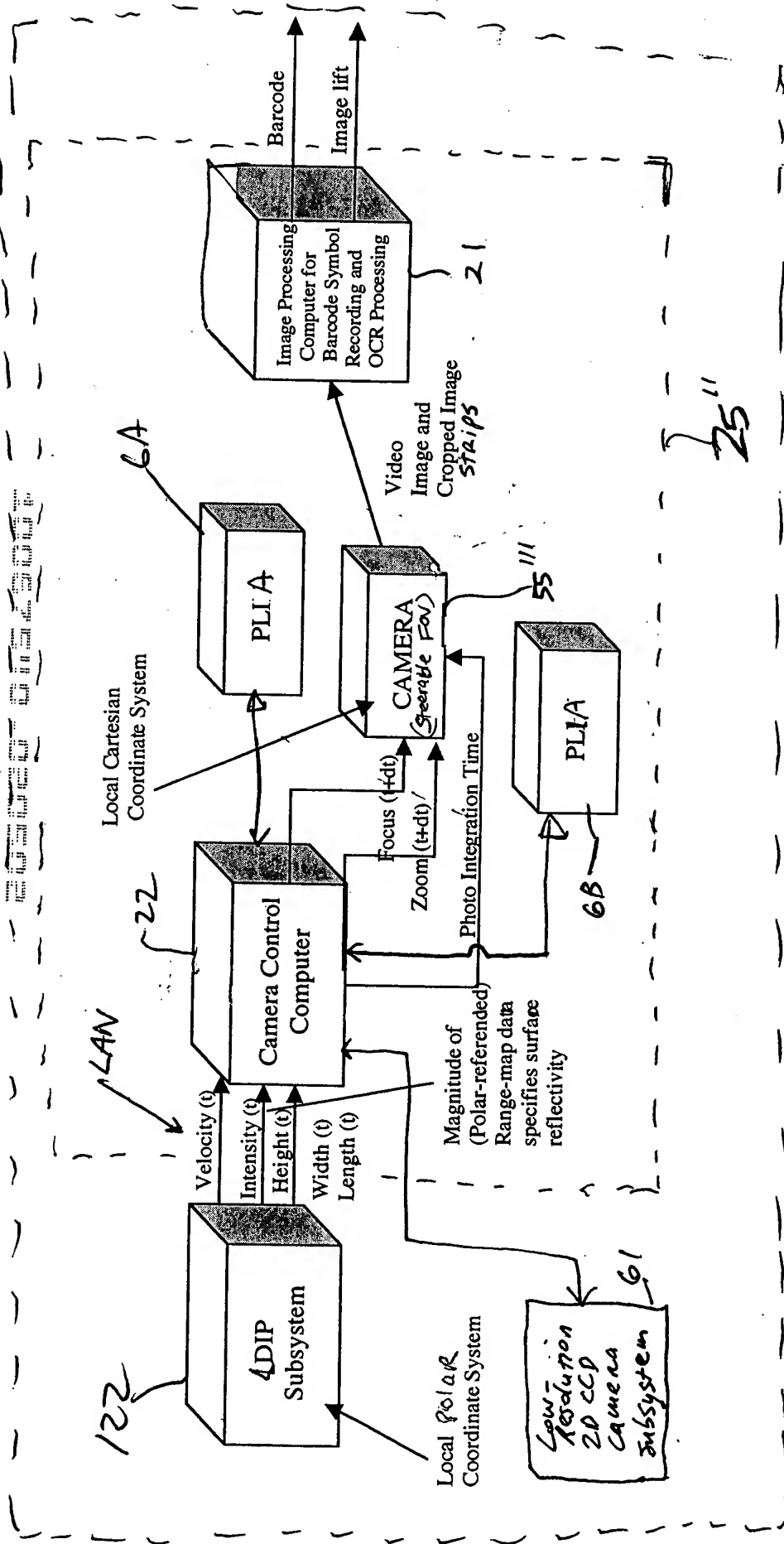
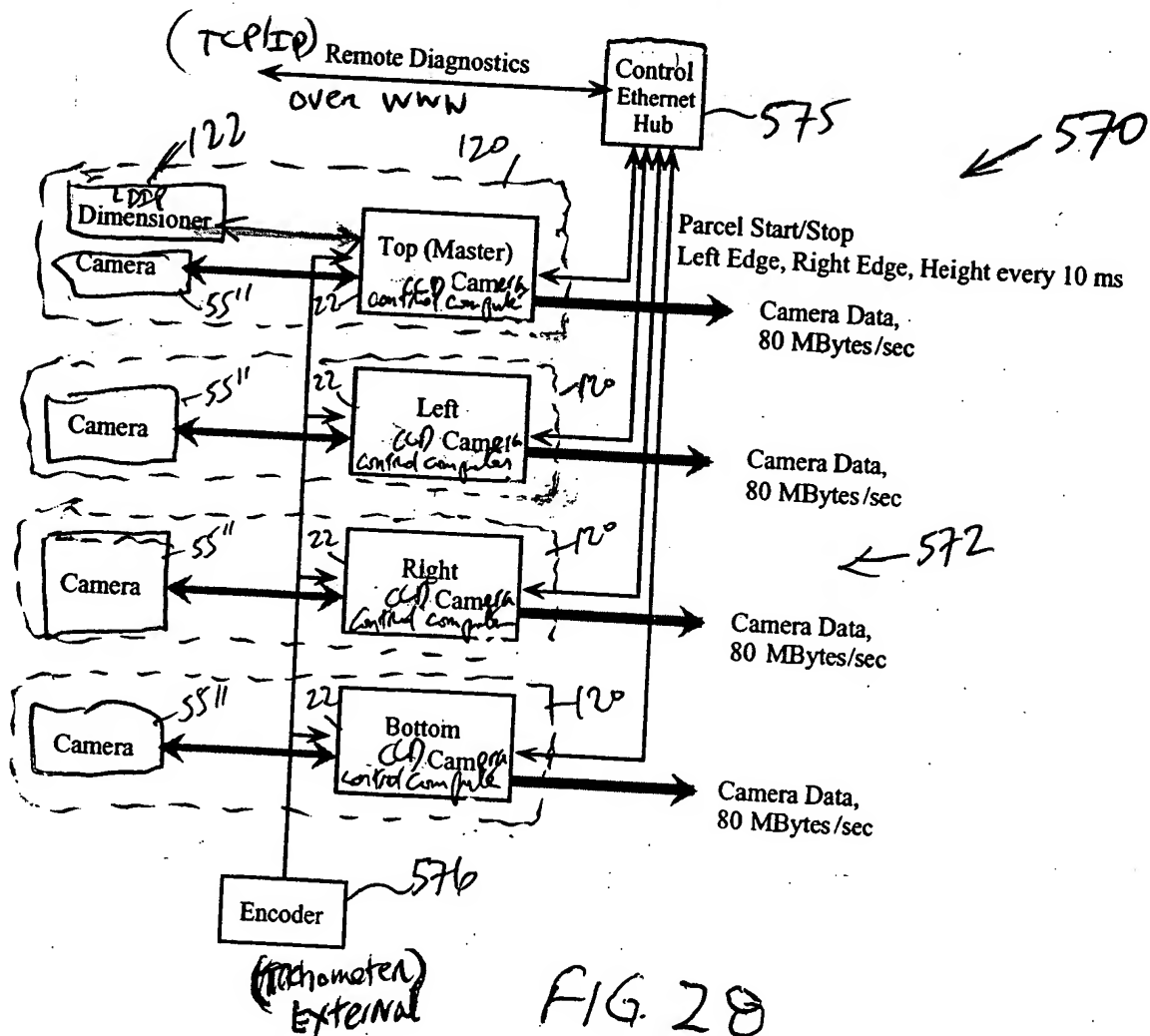
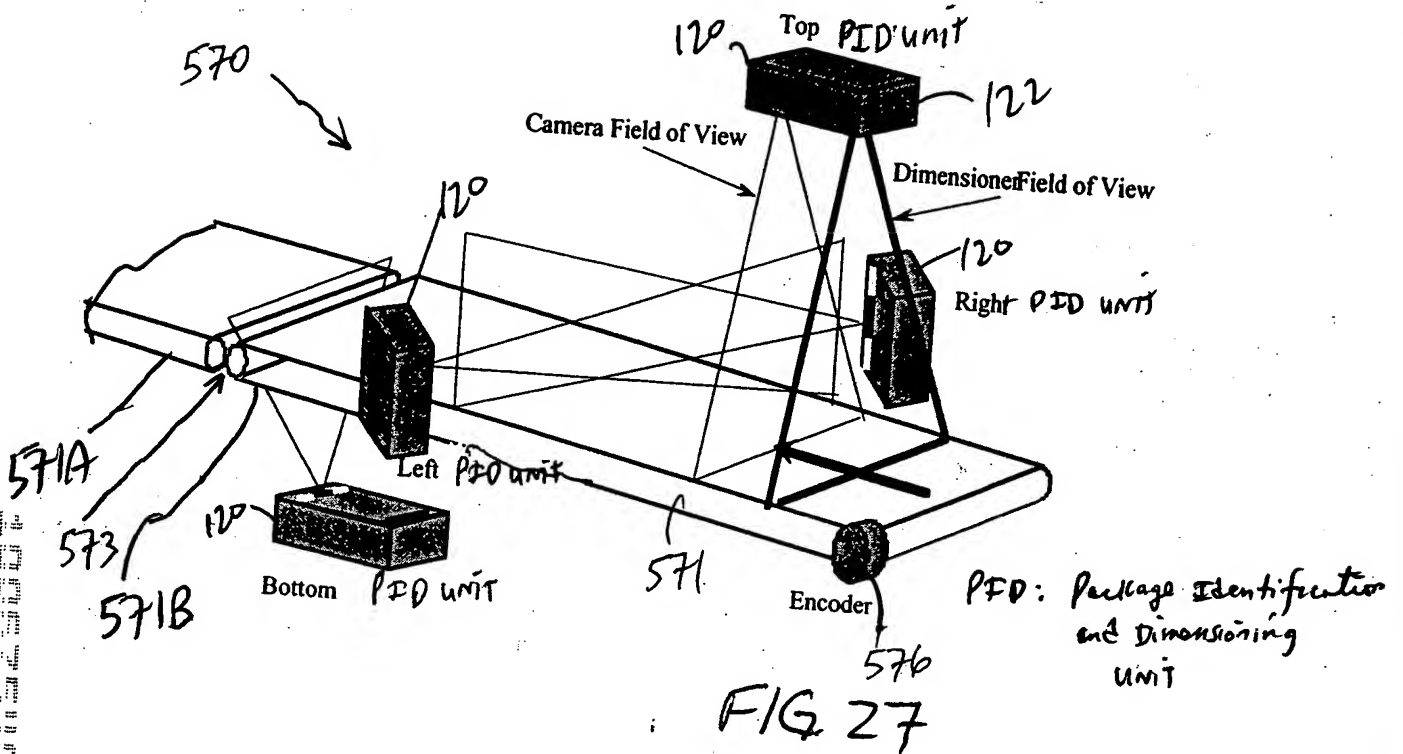


FIG. 26



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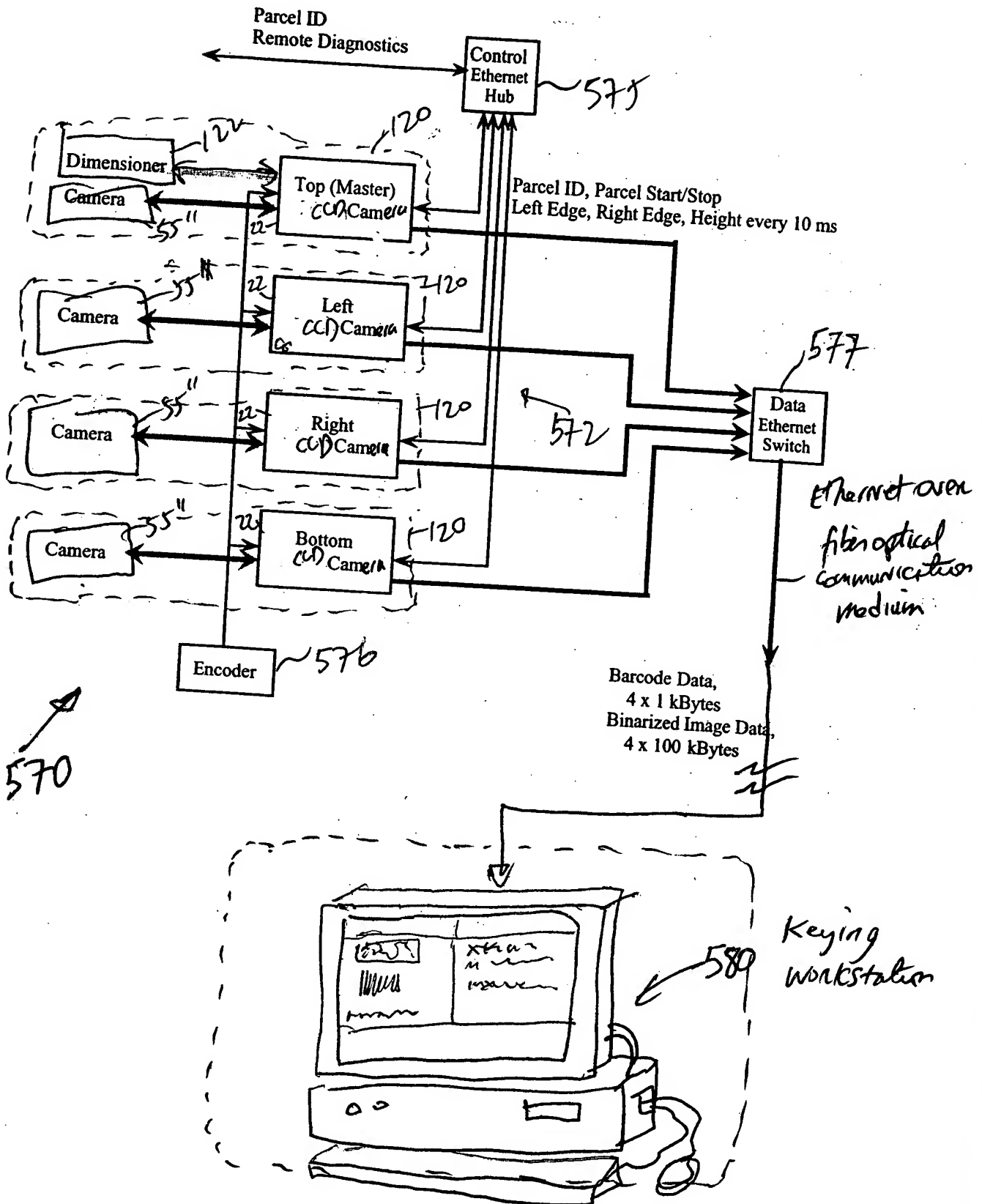


FIG. 29

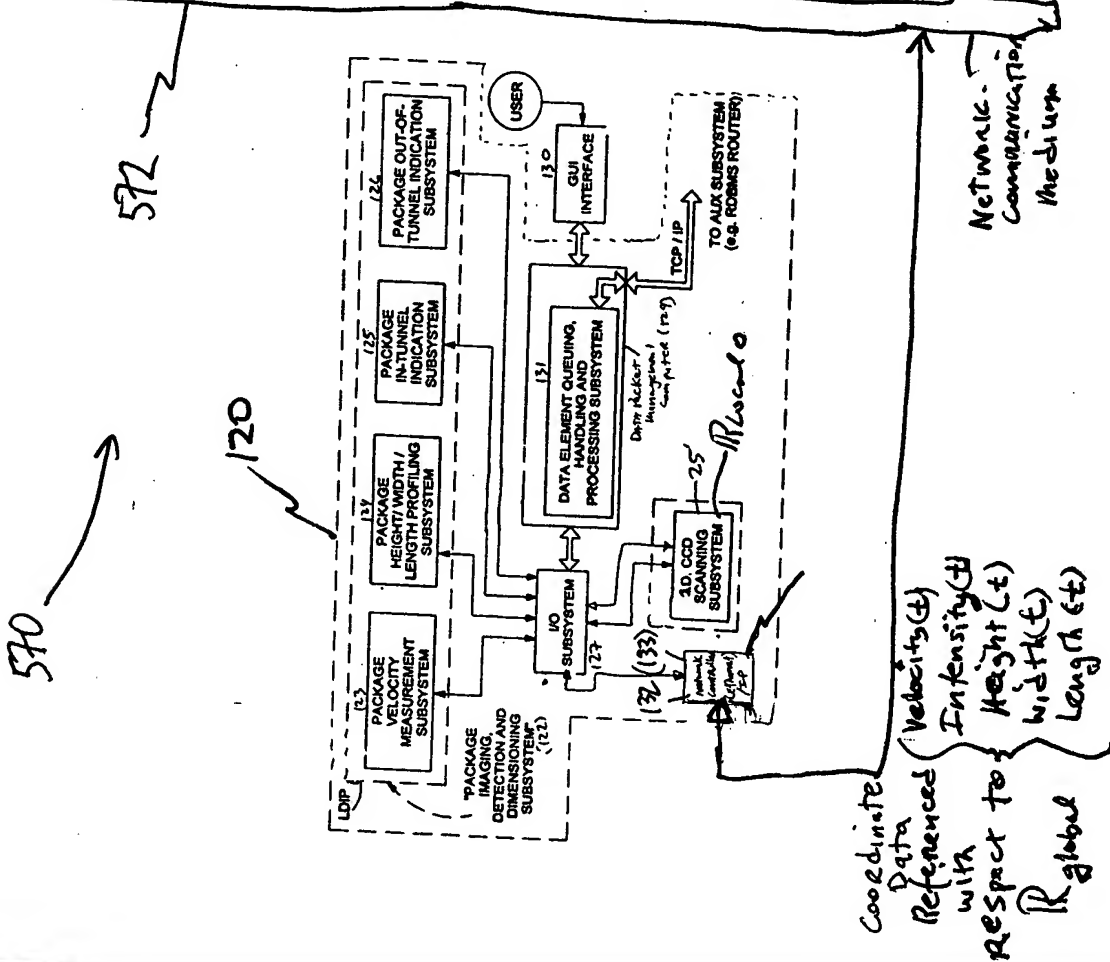
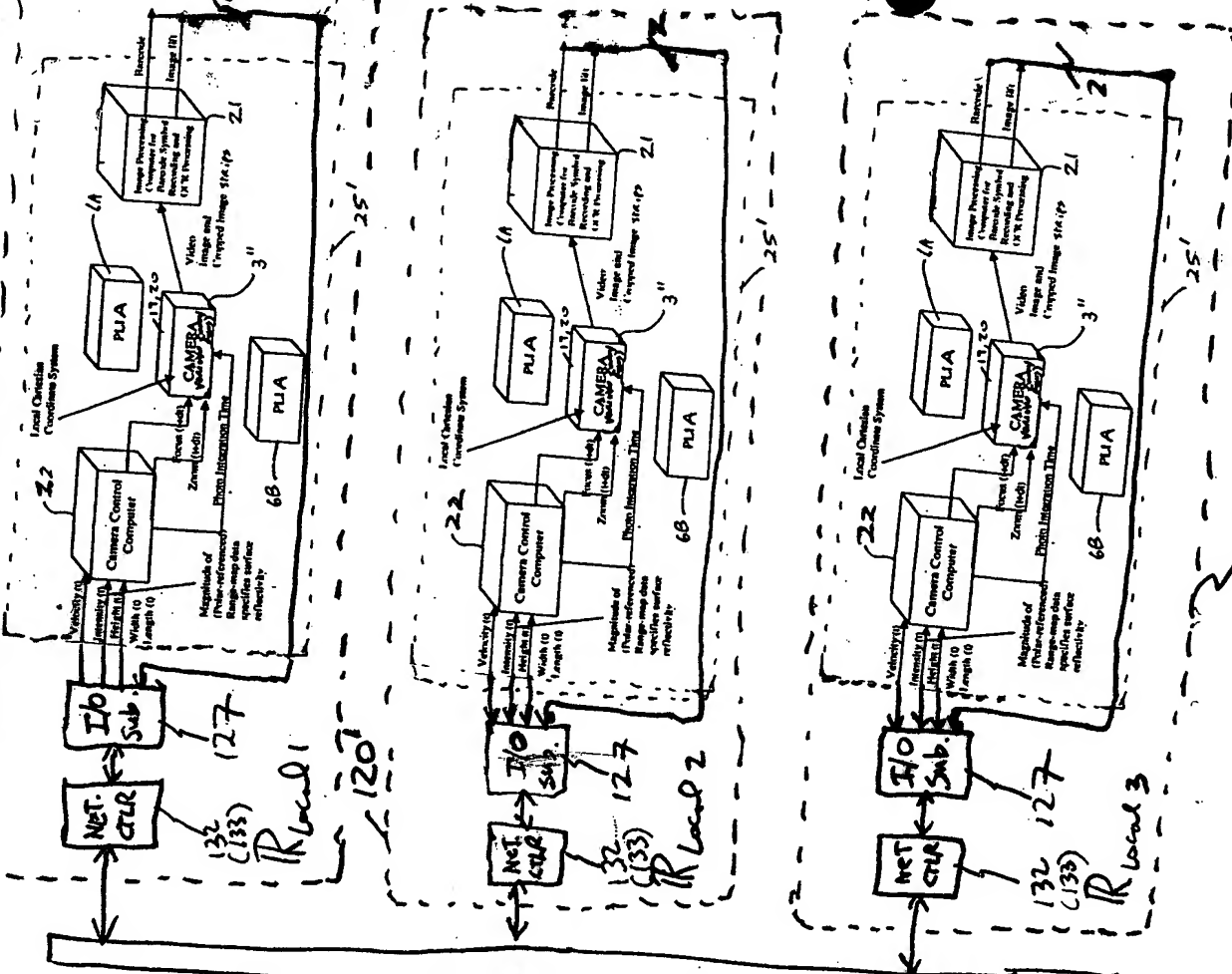
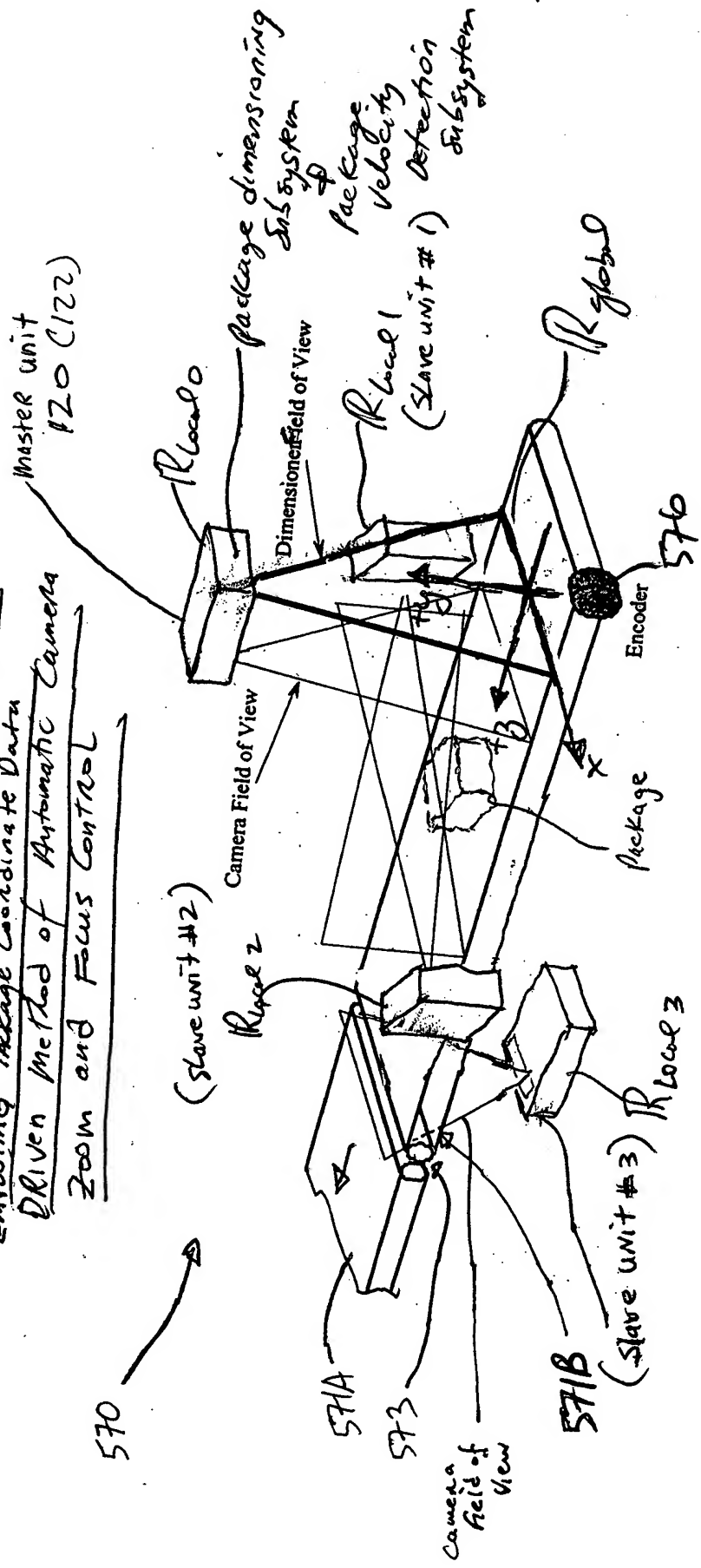


FIG 30

CCD Camera-Based Tunnel System
Employing Package Coordinate Data
Driven Method of Automatic Camera
Zoom and Focus Control



Package Coordinate Data \parallel R_{global} \Rightarrow Package Coordinate Data \parallel $R_{local i}$

FIG. 31

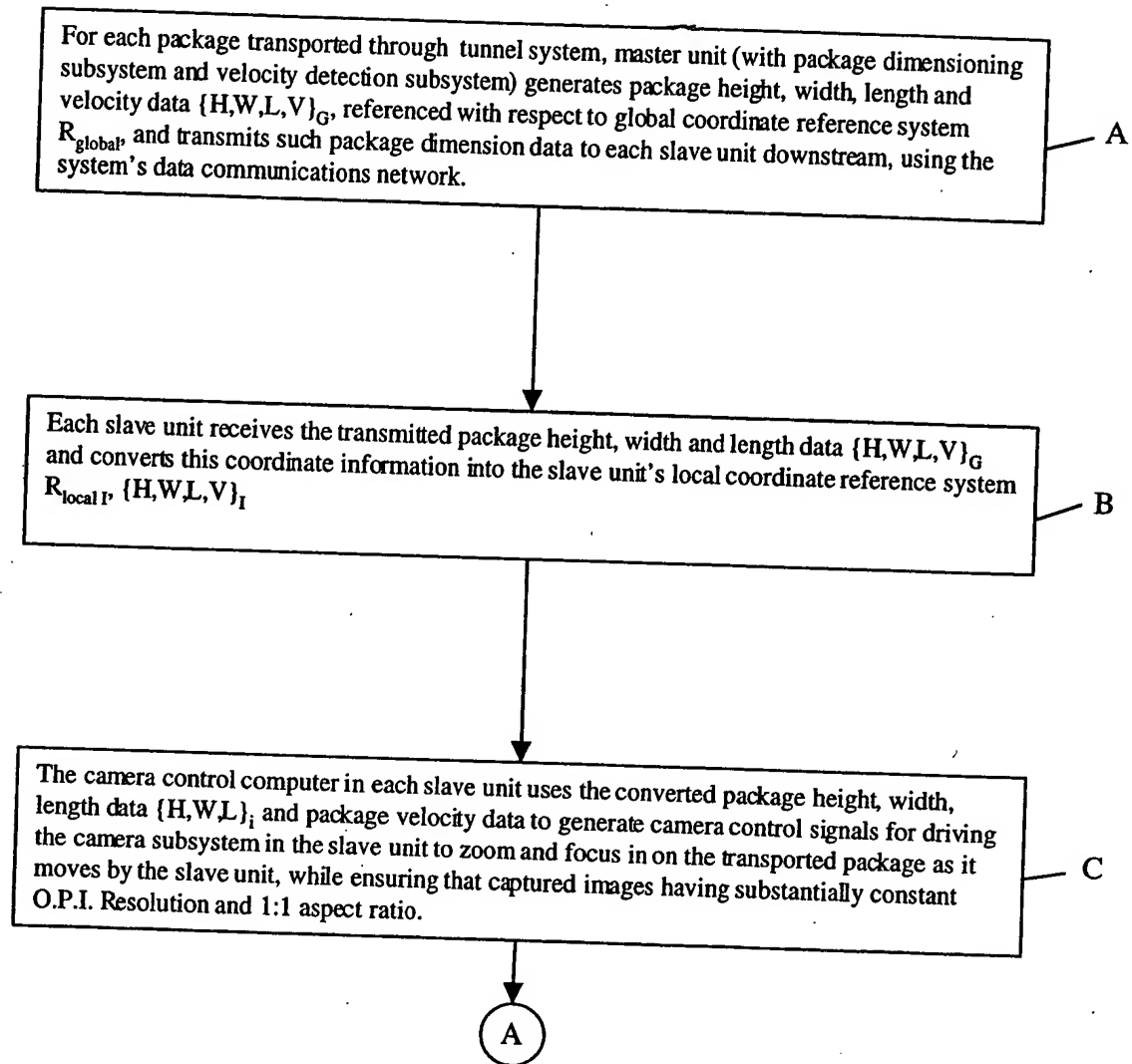


FIG. 32A

A

Each slave unit captures images acquired by its intelligently controlled camera subsystem, buffers the same, and processes the images to decode bar code symbol identifiers represented in said images, and/or to perform optical character recognition (OCR) thereupon.

D

The slave unit which decodes a bar code symbol in a processed image automatically transmits a package identification data element (containing symbol character data representative of the decoded bar code symbol) to the master unit (or other designated system control unit employing data element management functionalities) for package data element processing.

E

Master unit time-stamps received package identification data element, places said data element in a data queue, and processes package identification data elements and time-stamped package dimension data elements in said queue to link each package identification data element with one said corresponding package dimension data element.

F

FIG. 32B

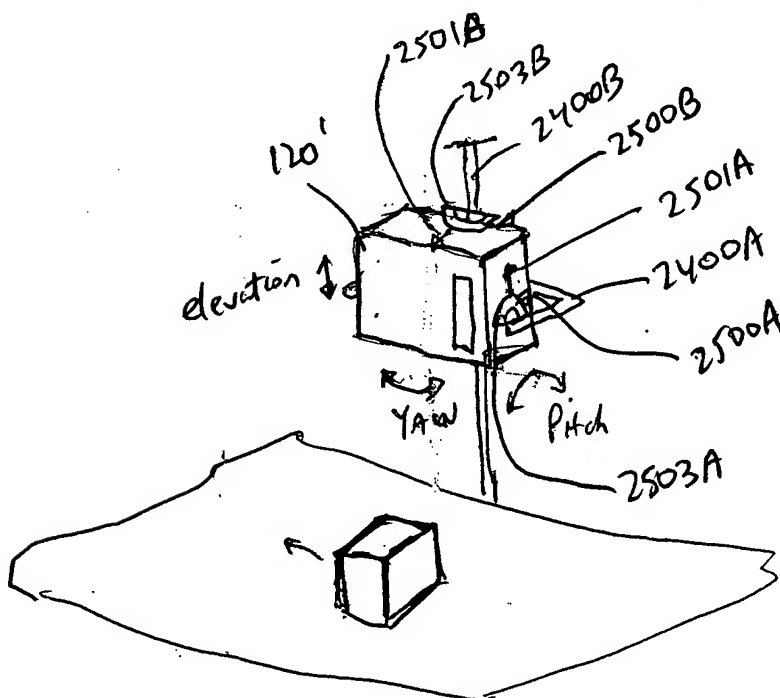
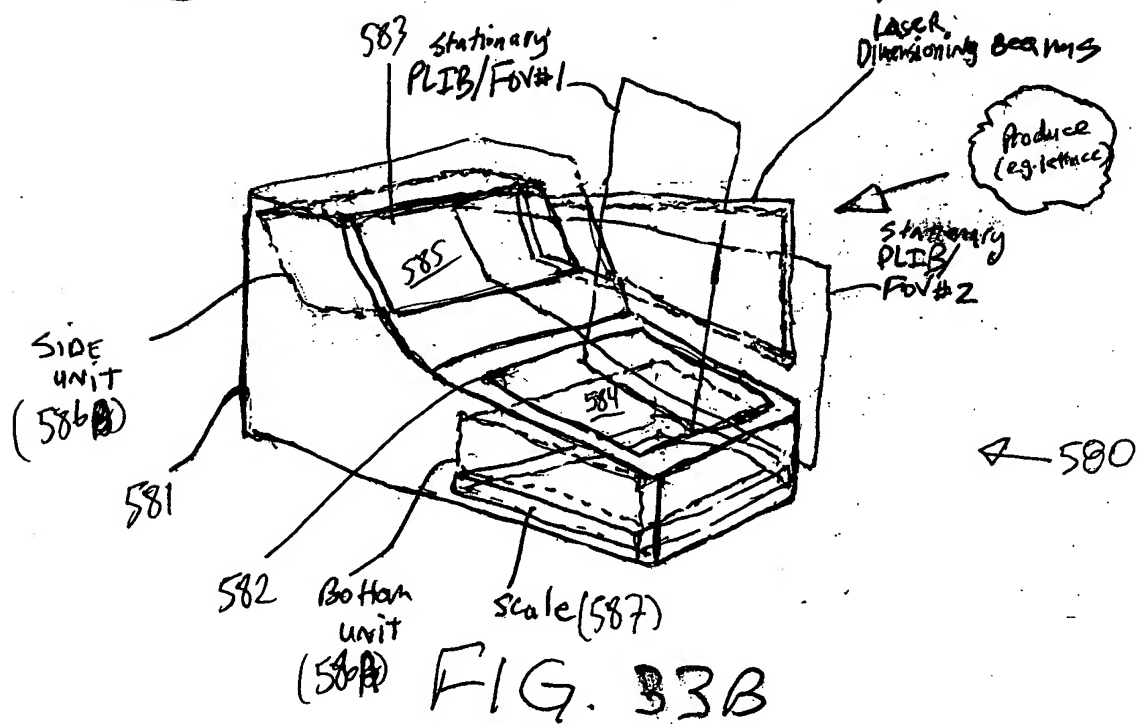
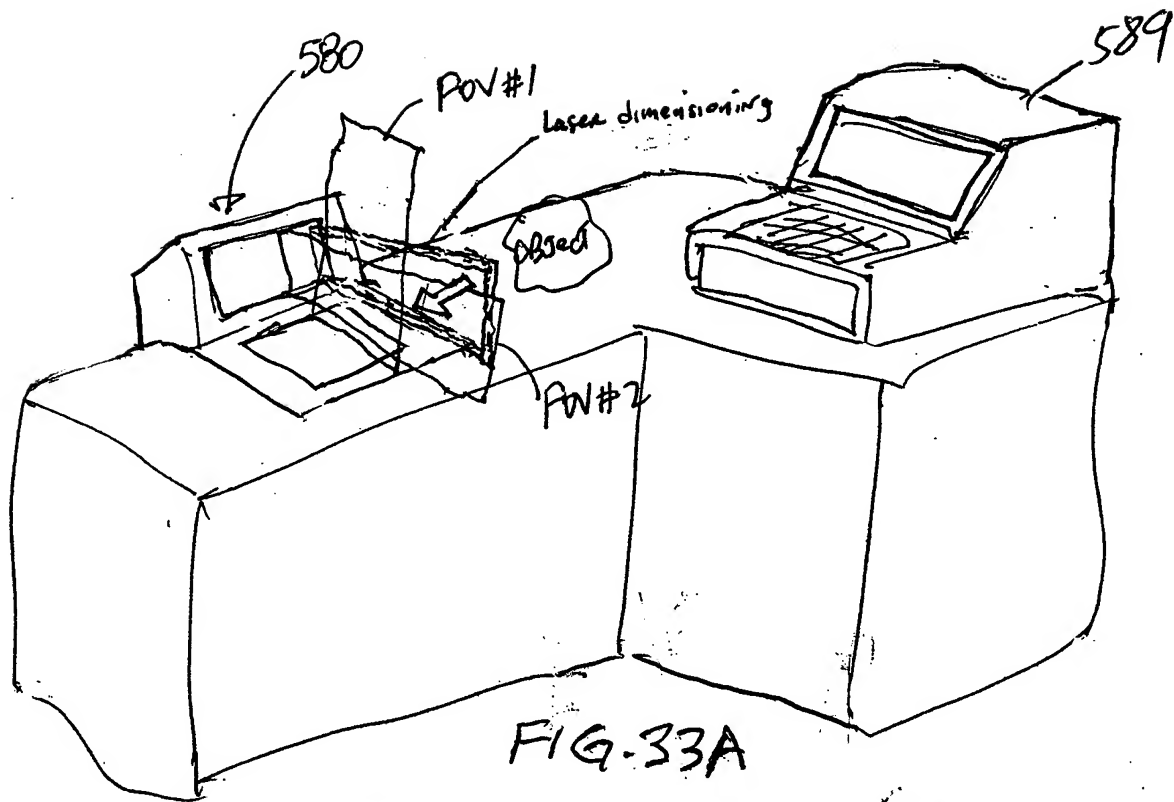


FIG. 31A

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580

586B

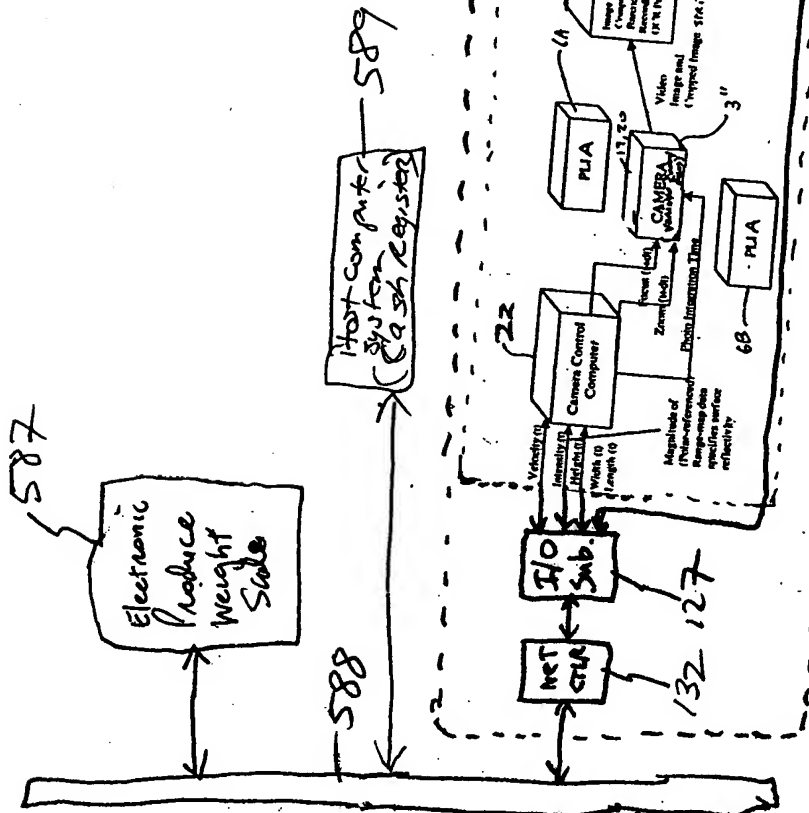
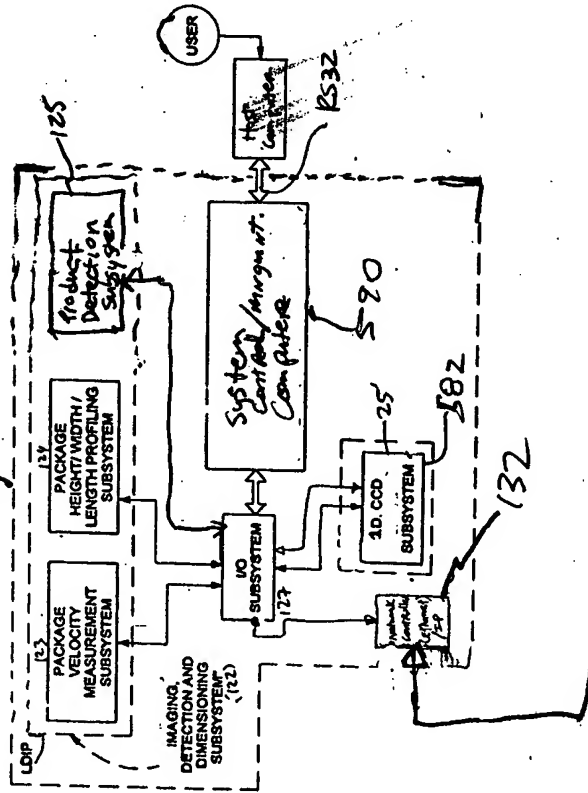


FIG. 33C

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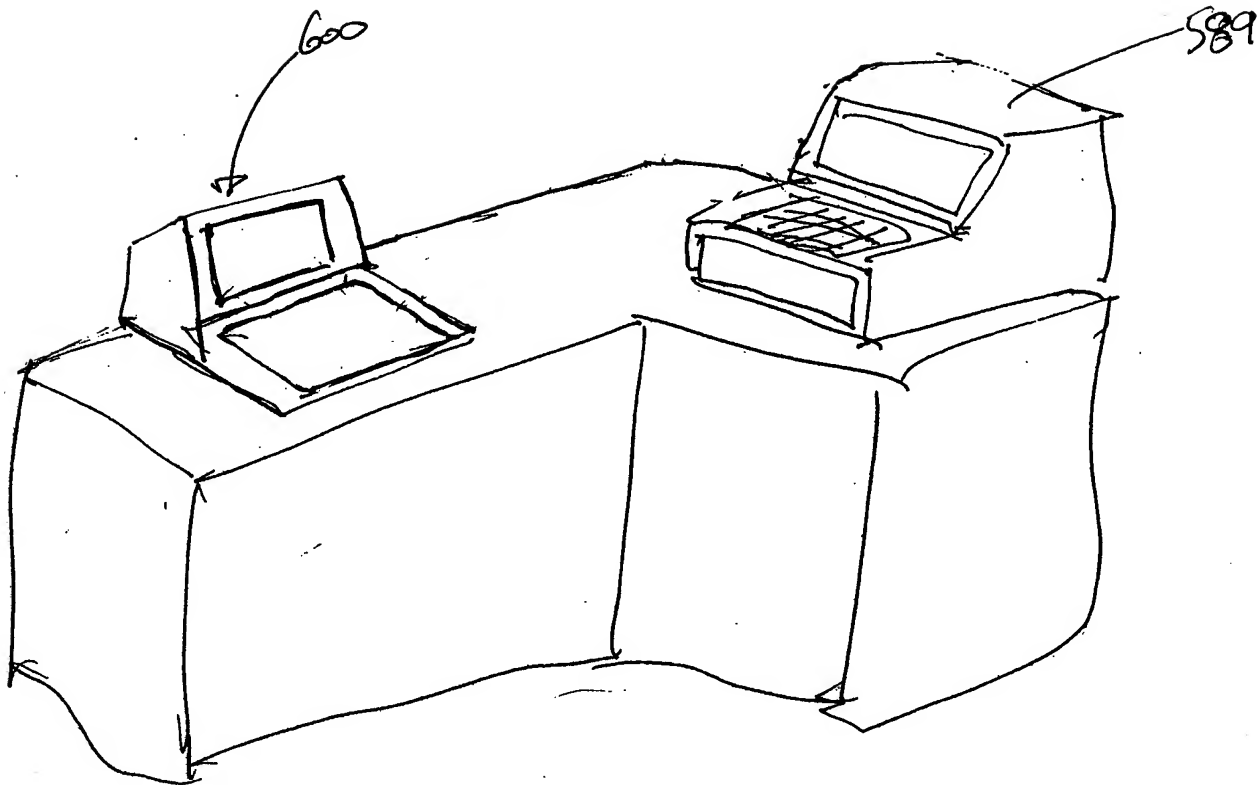


FIG. 34A

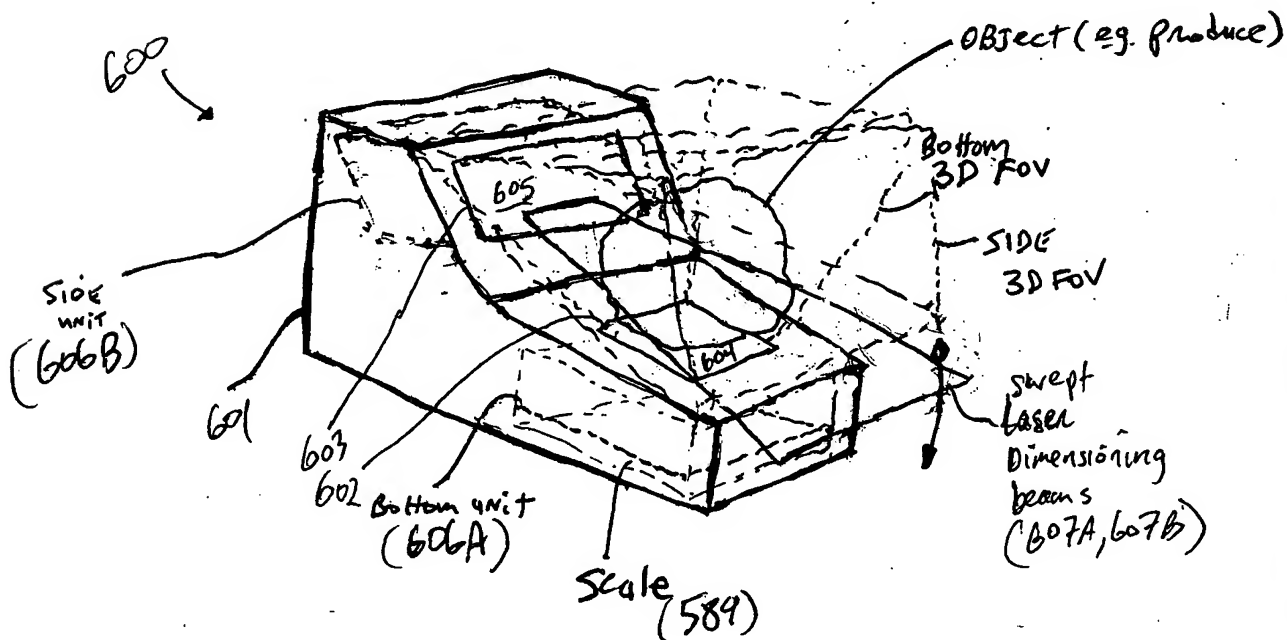


FIG. 34B

00000101000000

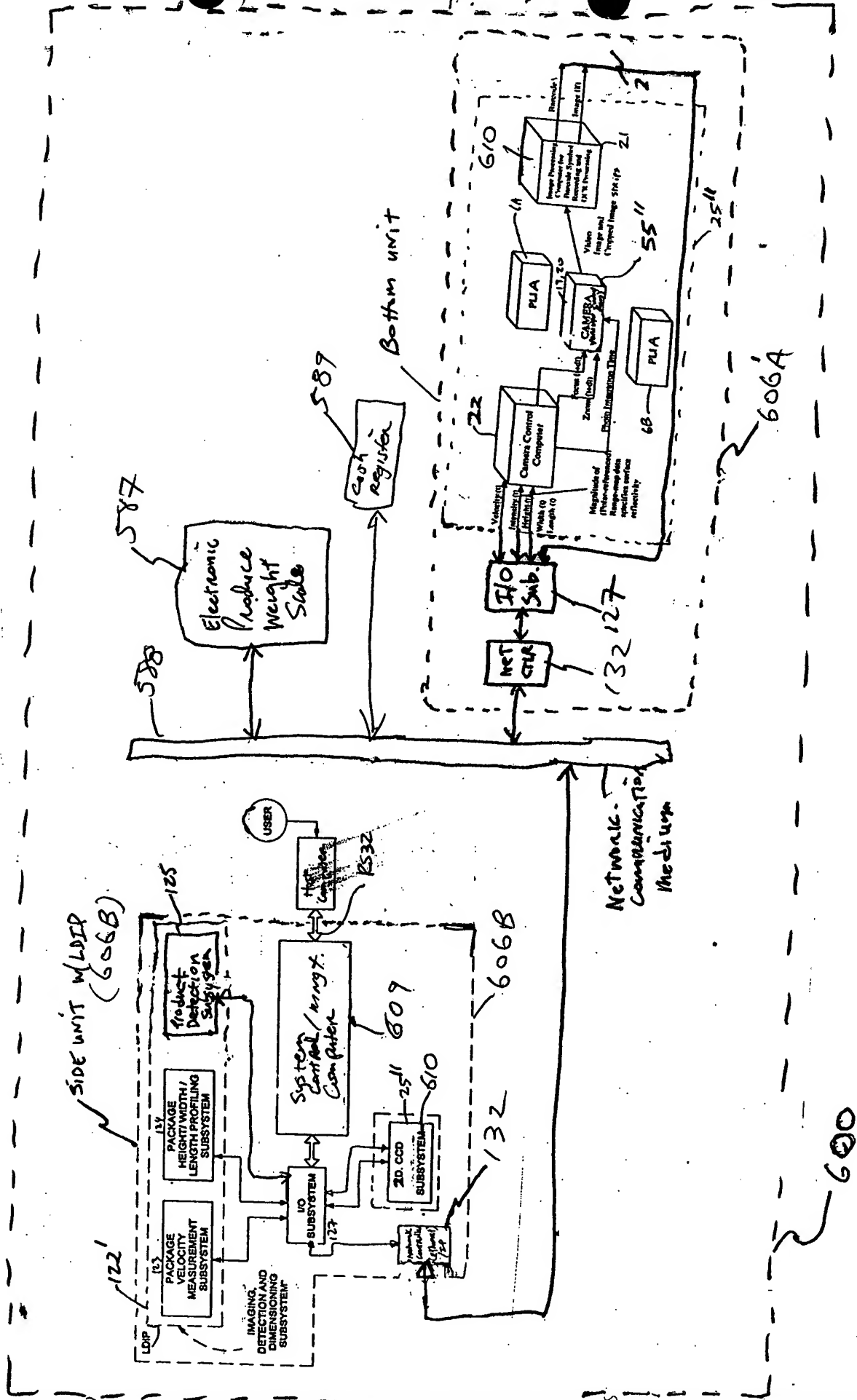
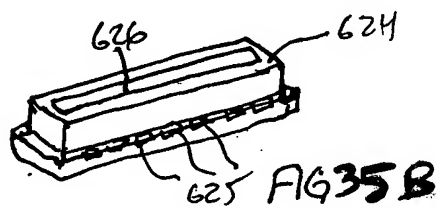
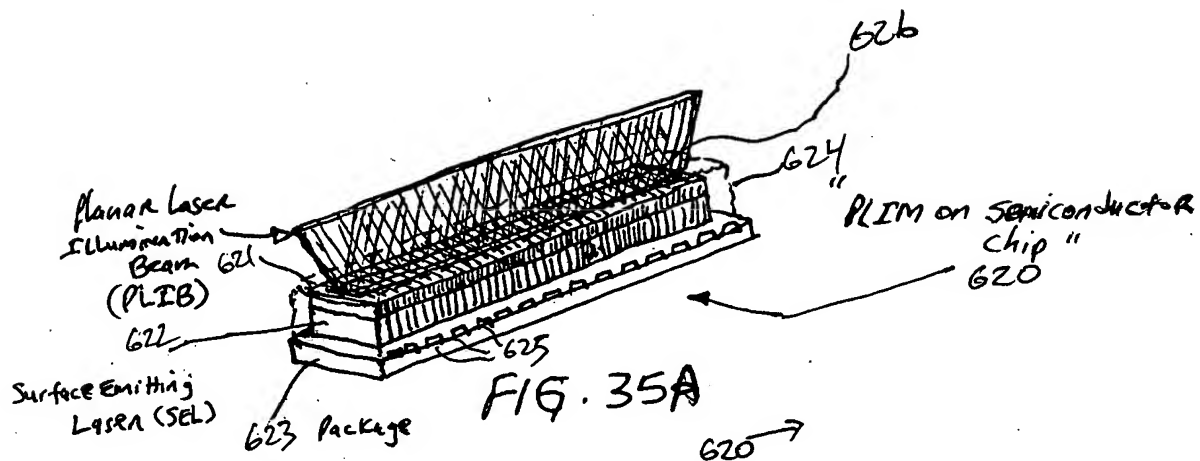
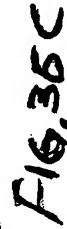


FIG. 34C





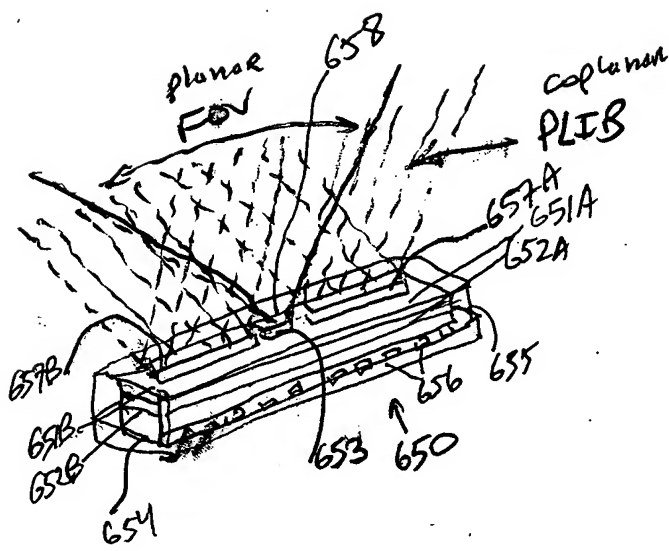


FIG. 37

360 →

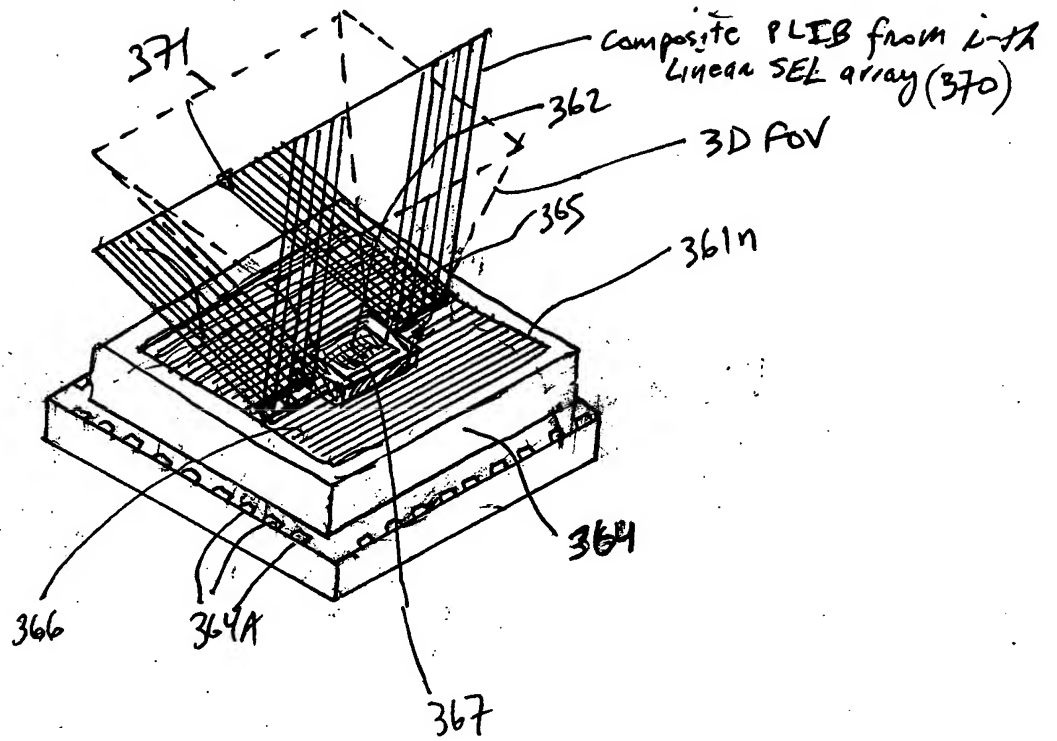


FIG. 38A

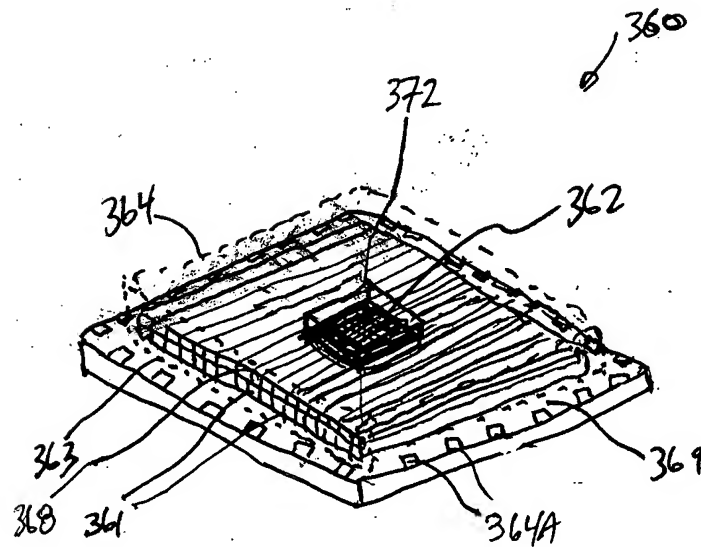


FIG. 38B

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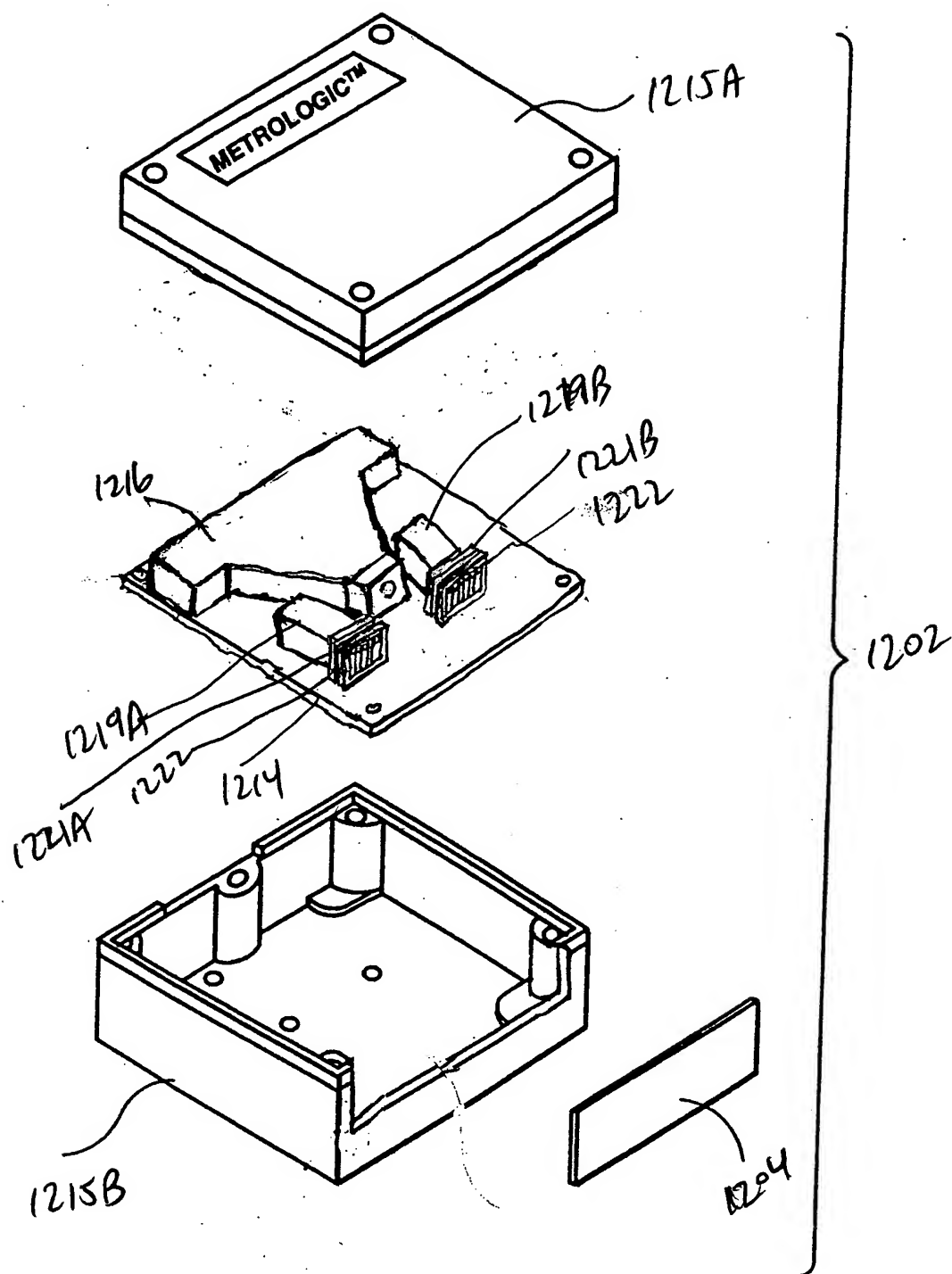


FIG. 39B

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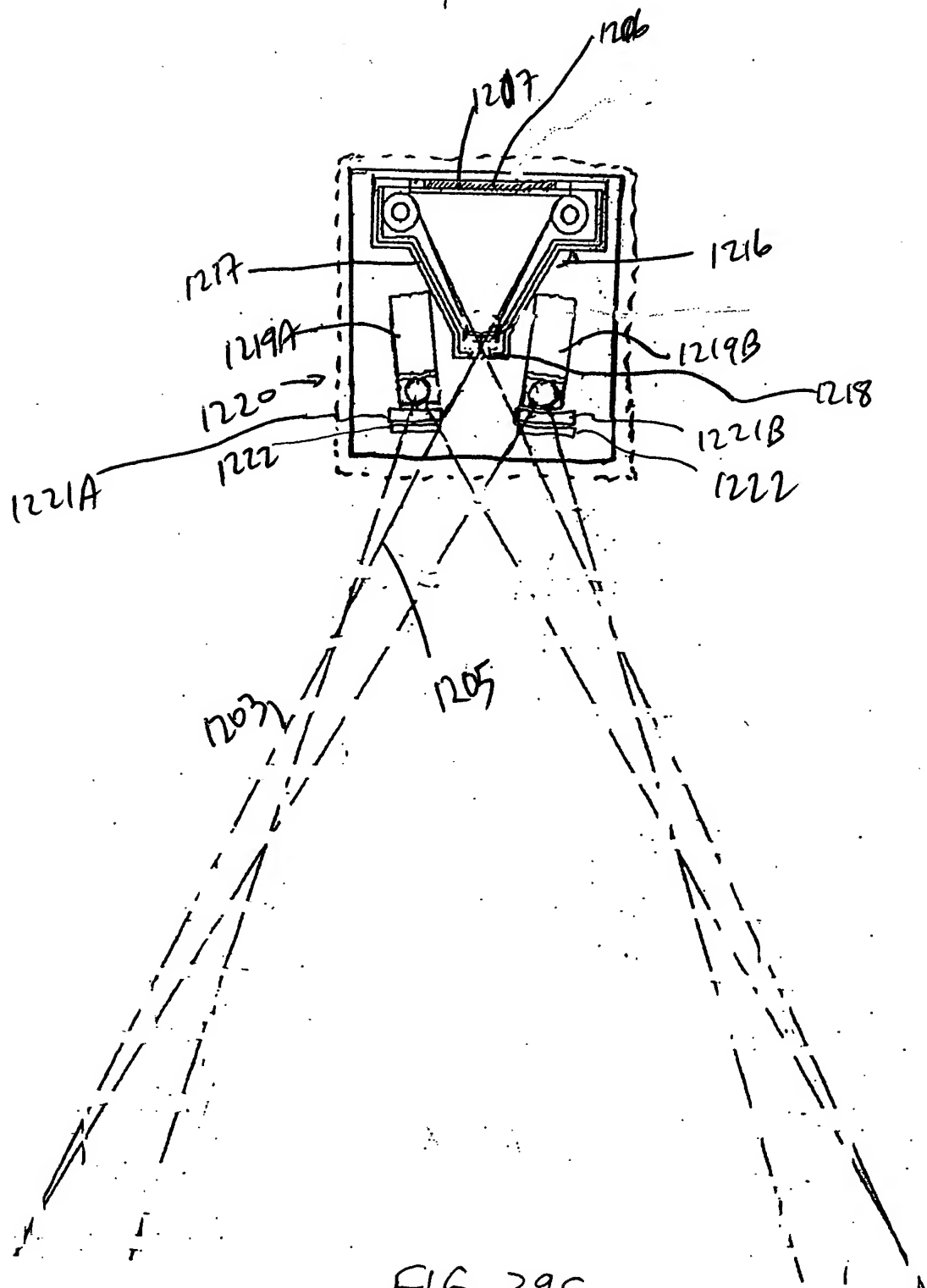


FIG. 39C

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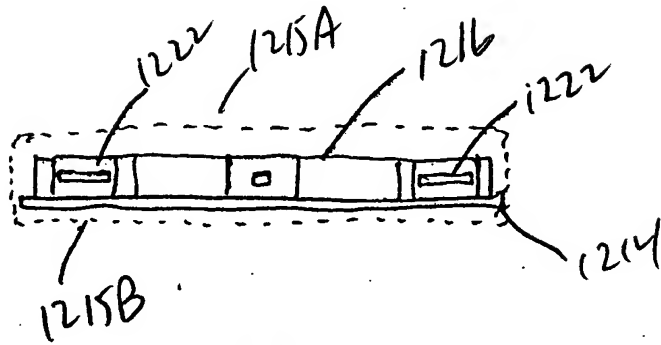


FIG. 39D

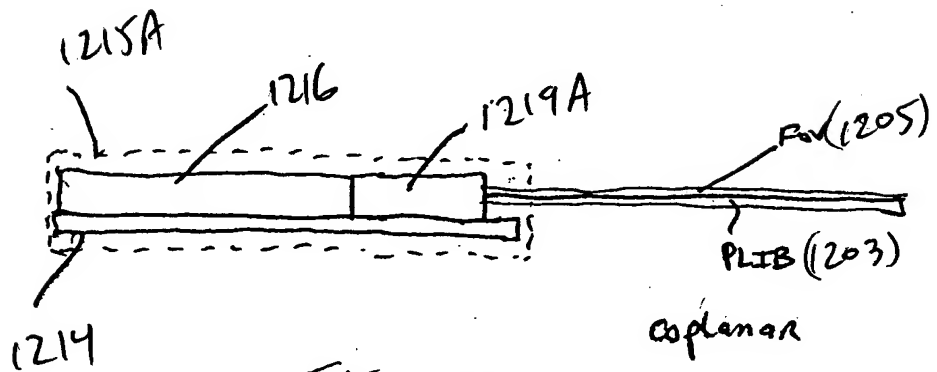


FIG. 39E

655000 01523006

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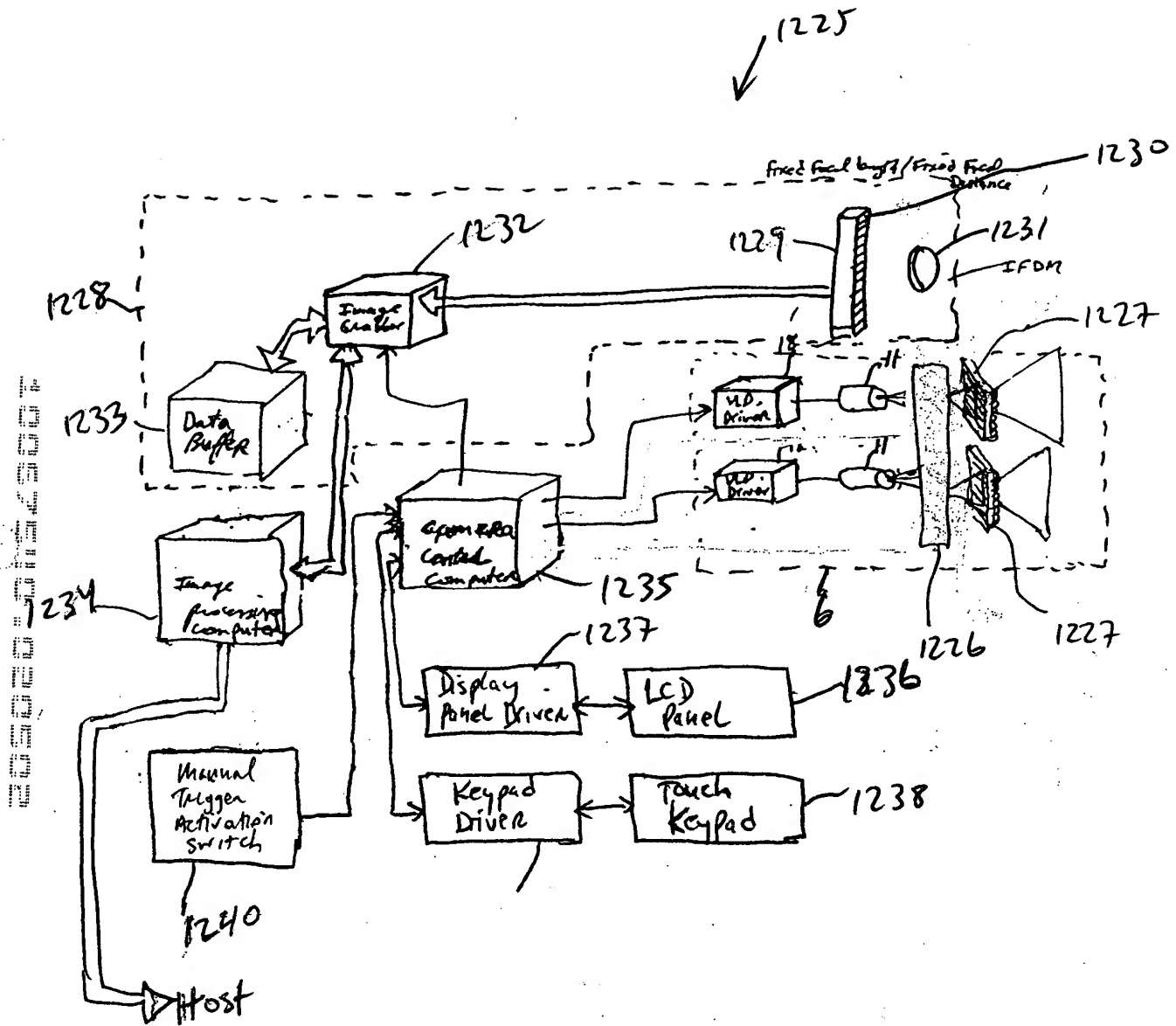
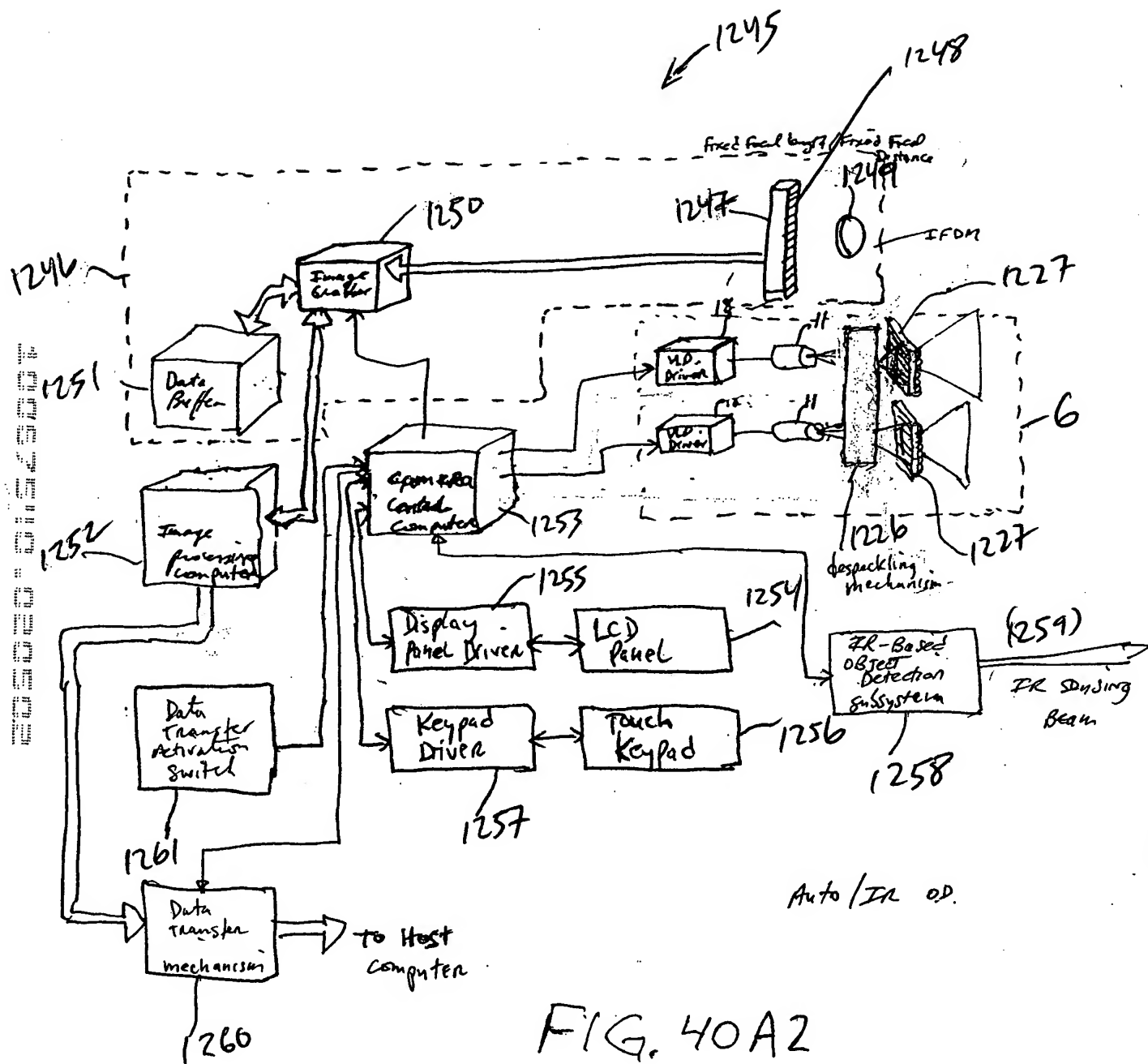


FIG. 40A1

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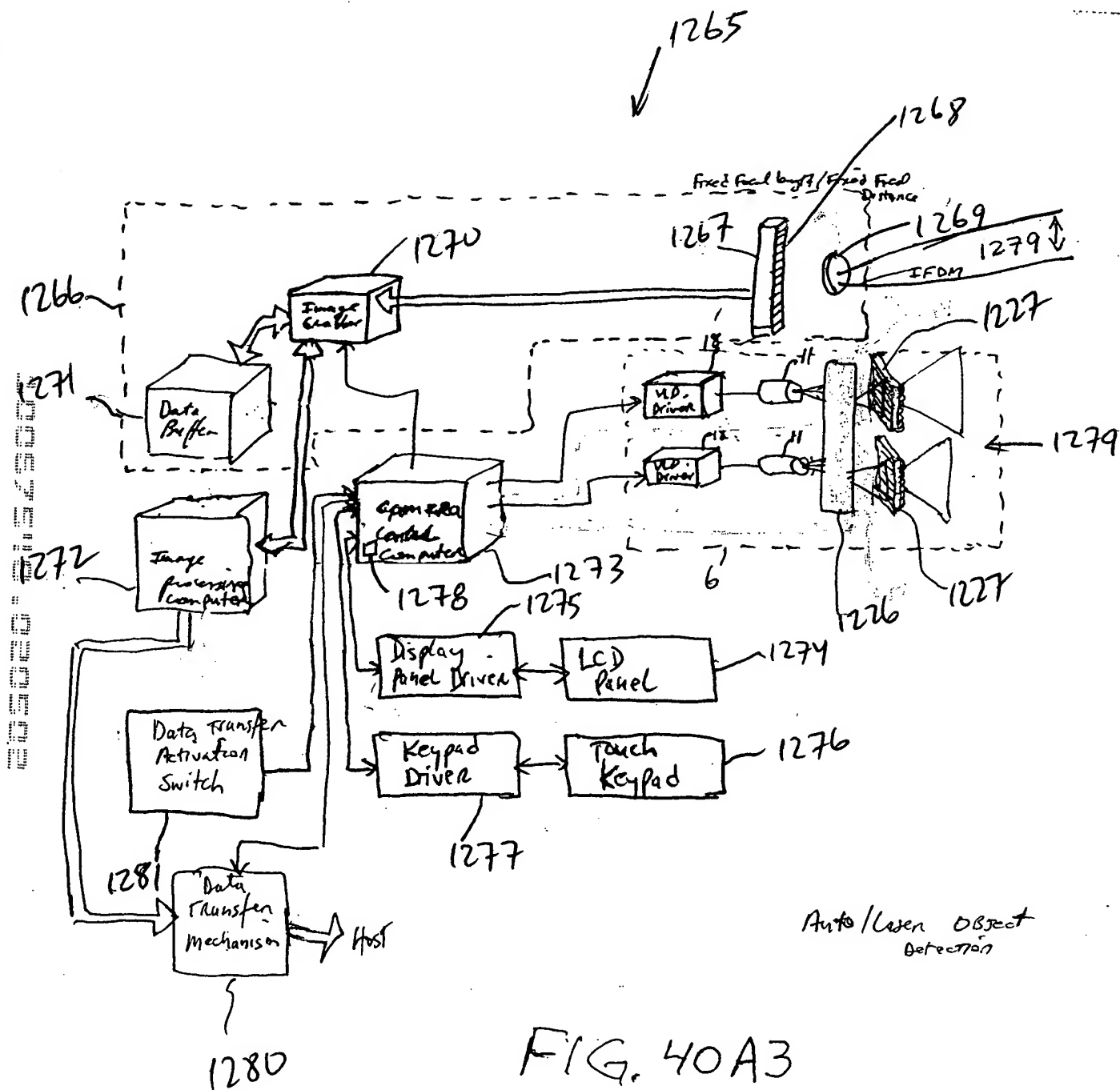
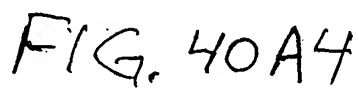
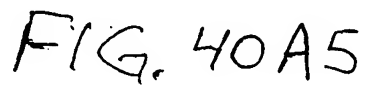


FIG. 40A3

[illegible]

1305
↓



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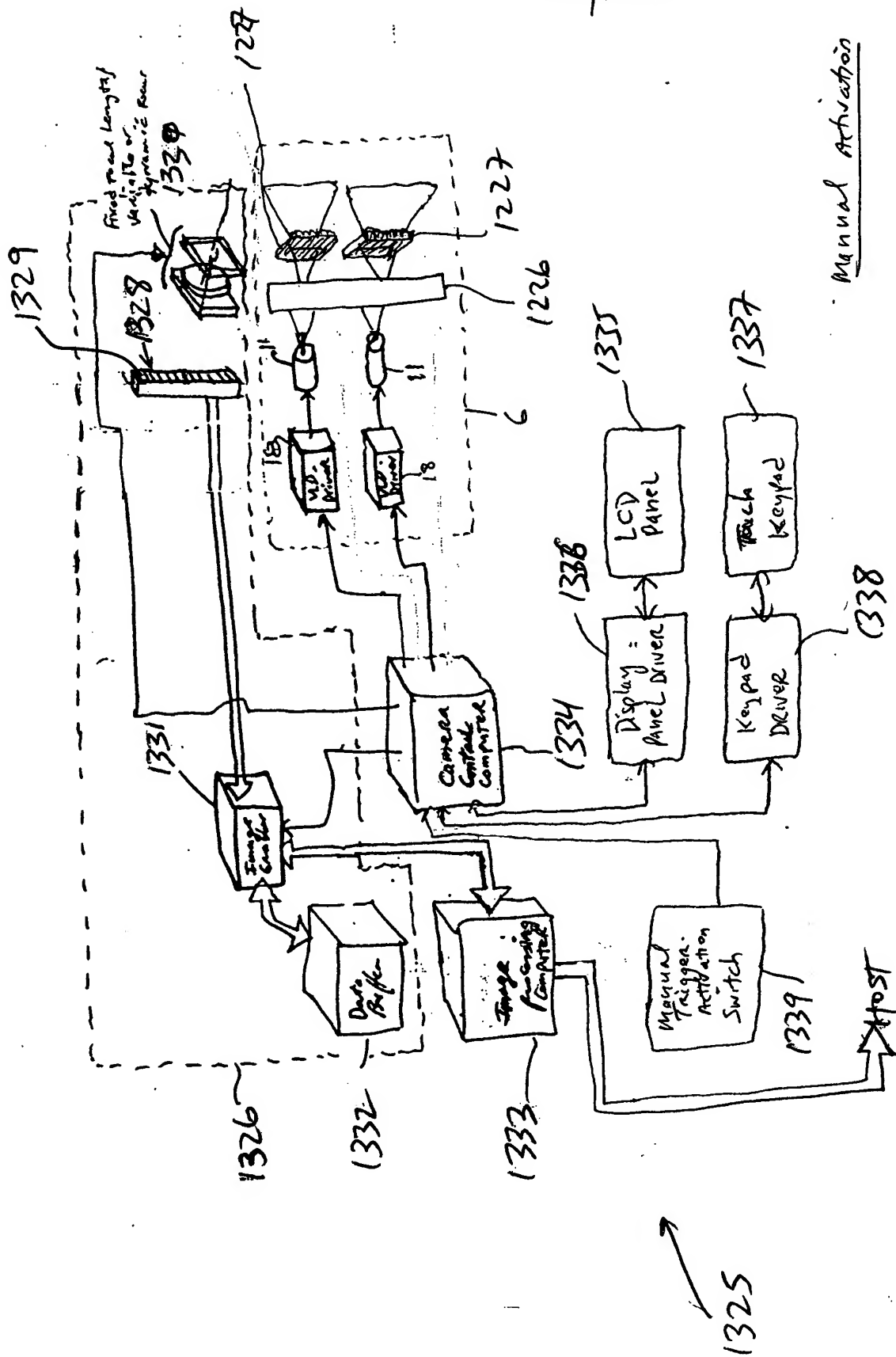


FIG. 40B1

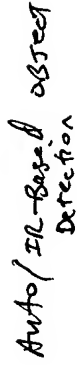


FIG. 40B2

25/332,

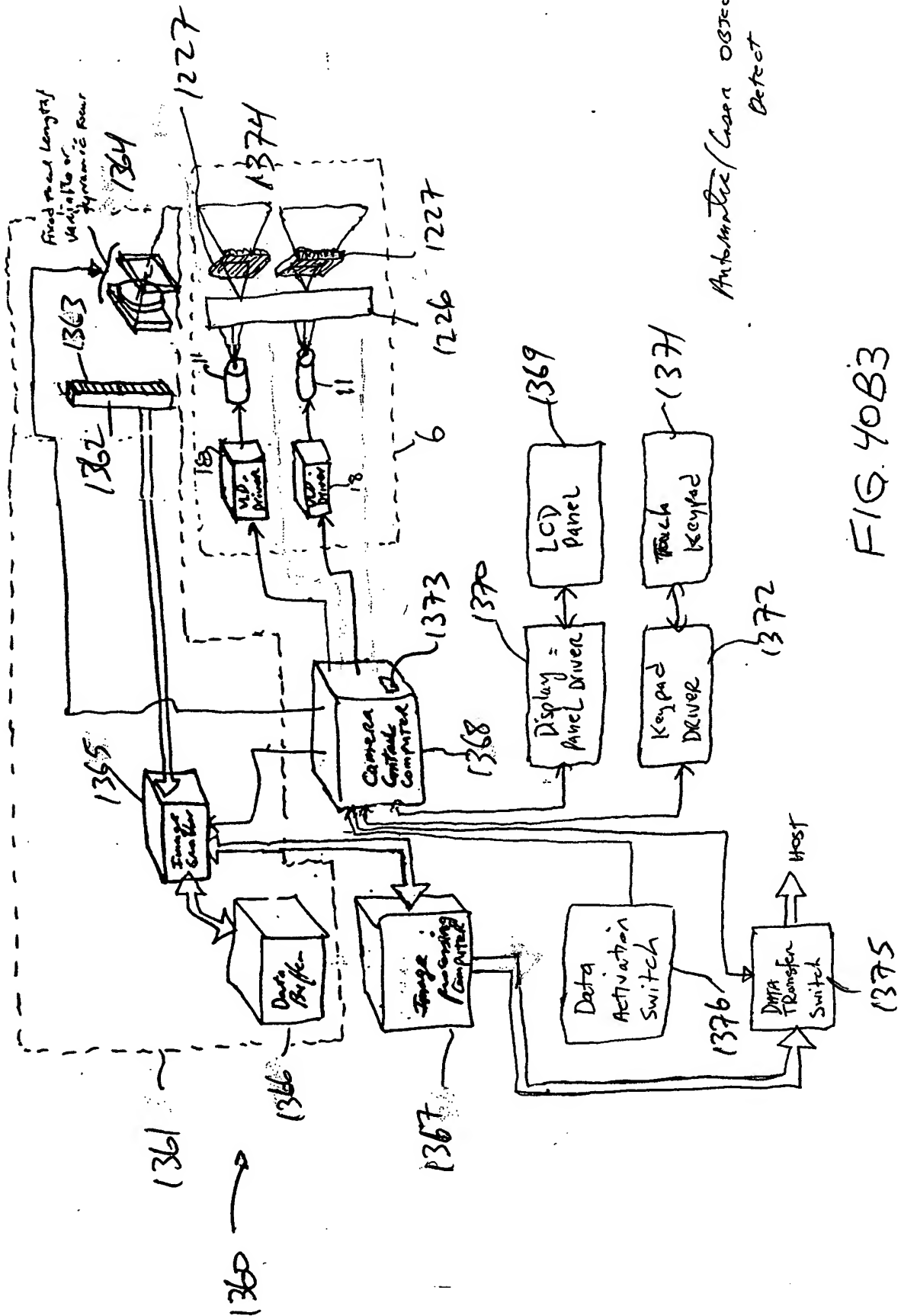


FIG. 40B3

Automatic/Manual Object Detect

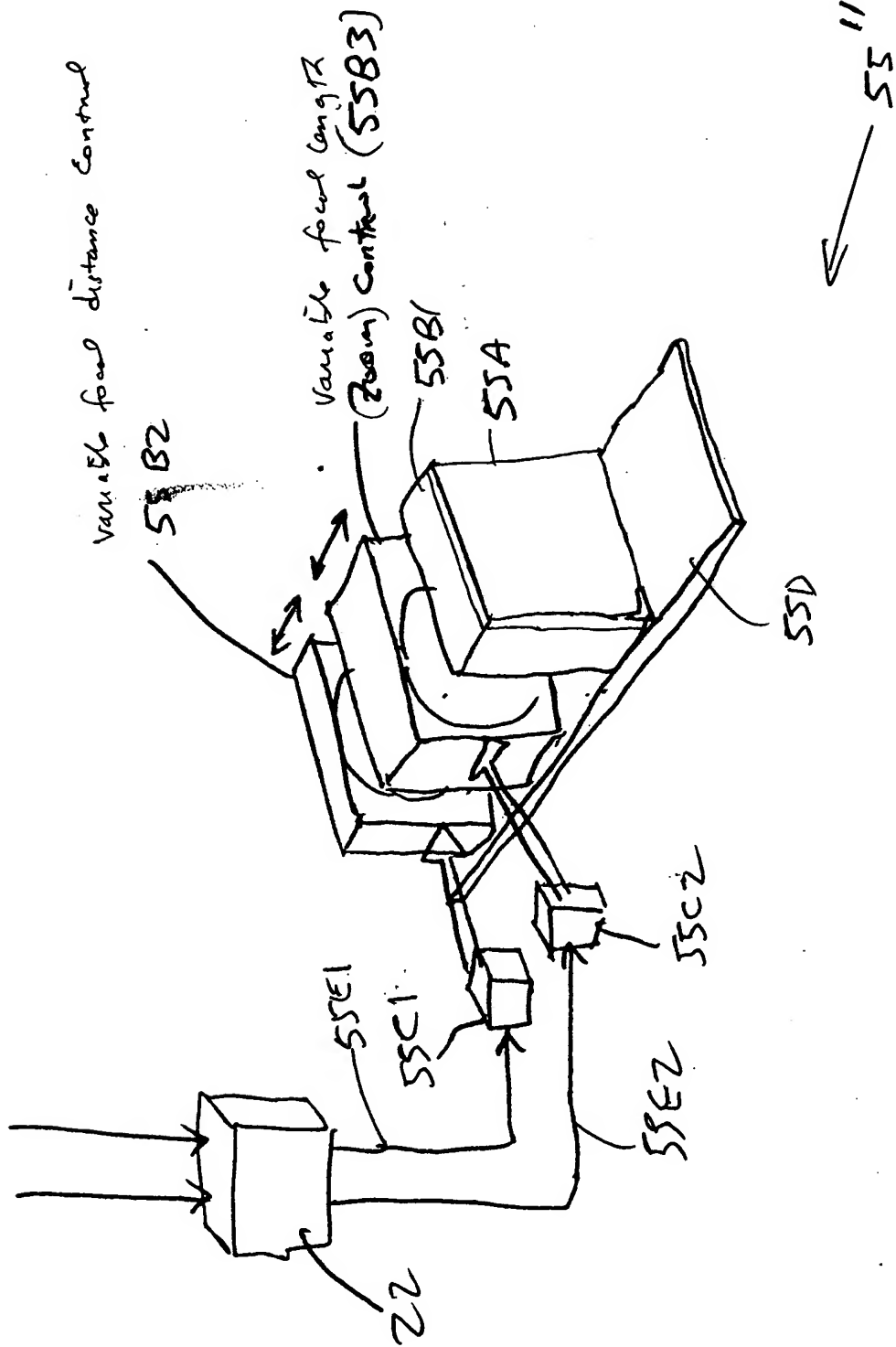


FIG. 6C4

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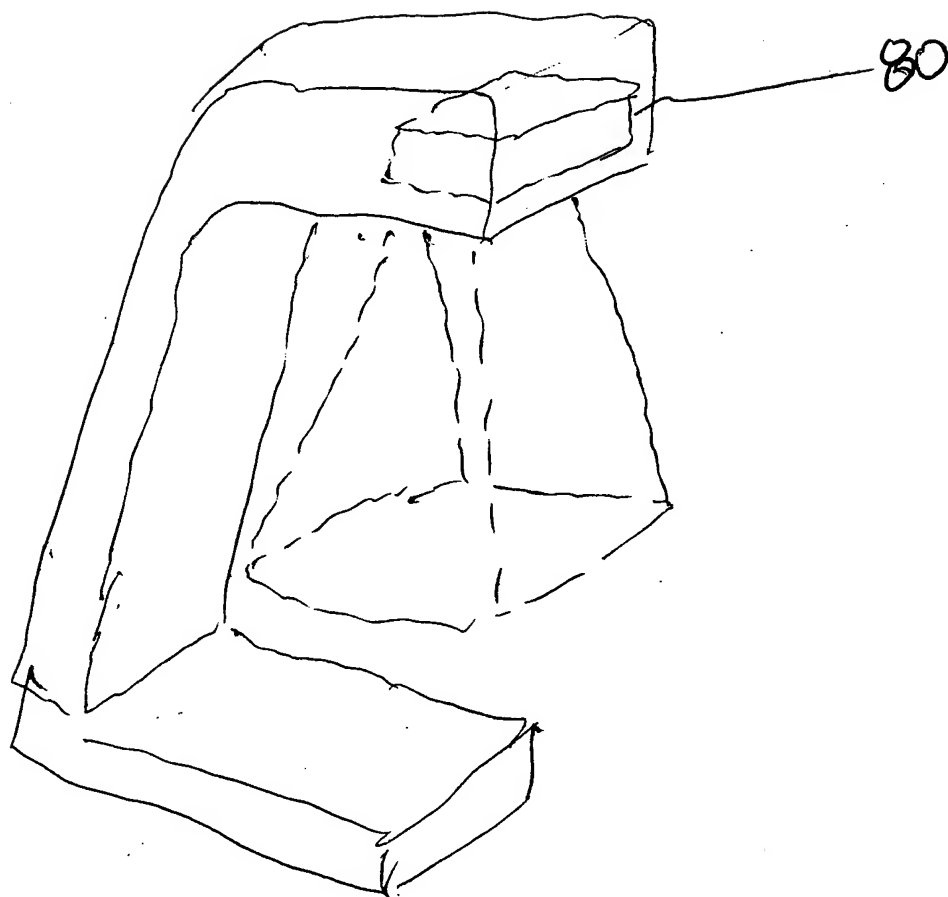


FIG. 6C5

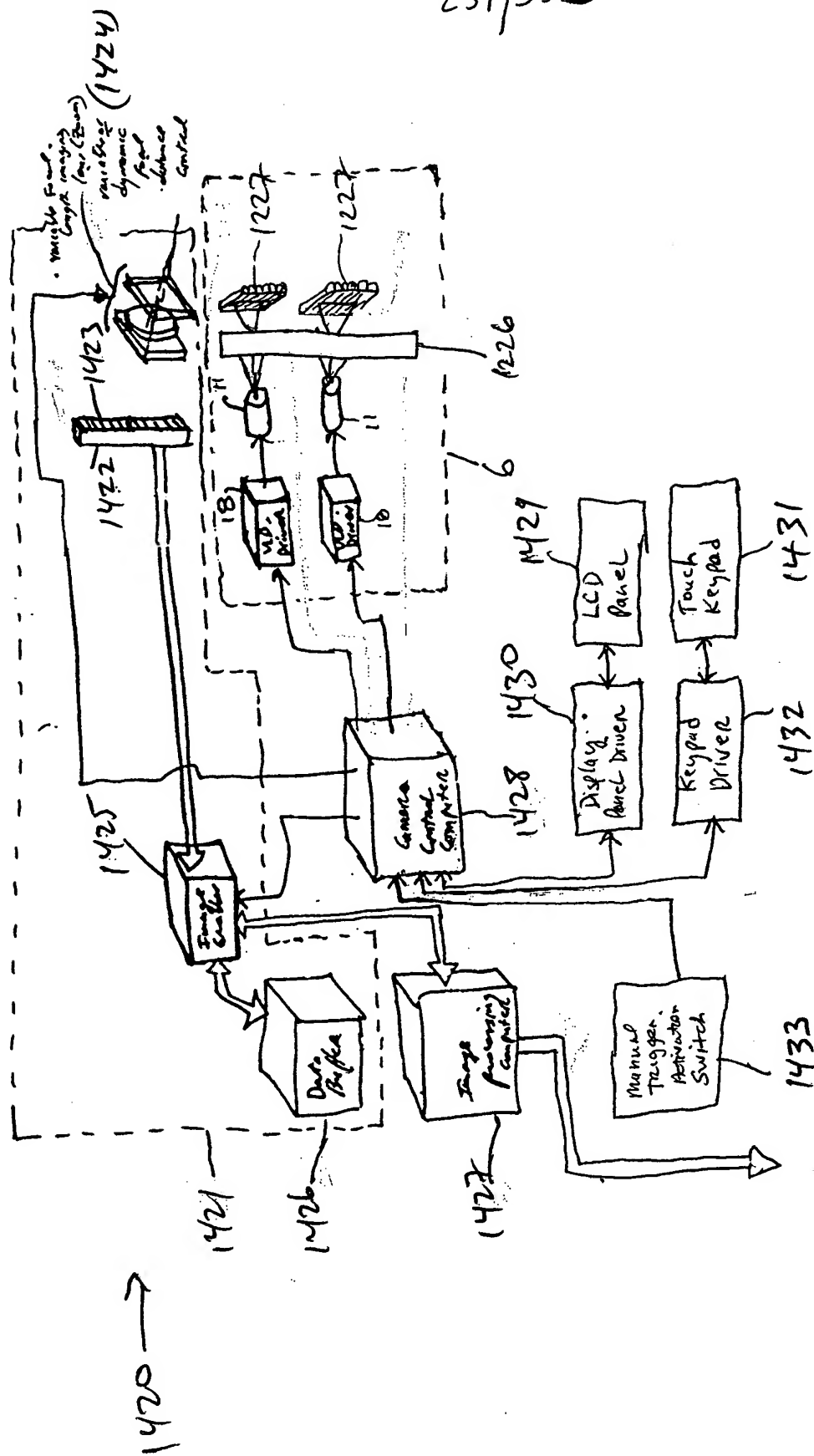
Antennature / C.D object detect.
(passive)



FIG. 40B.4



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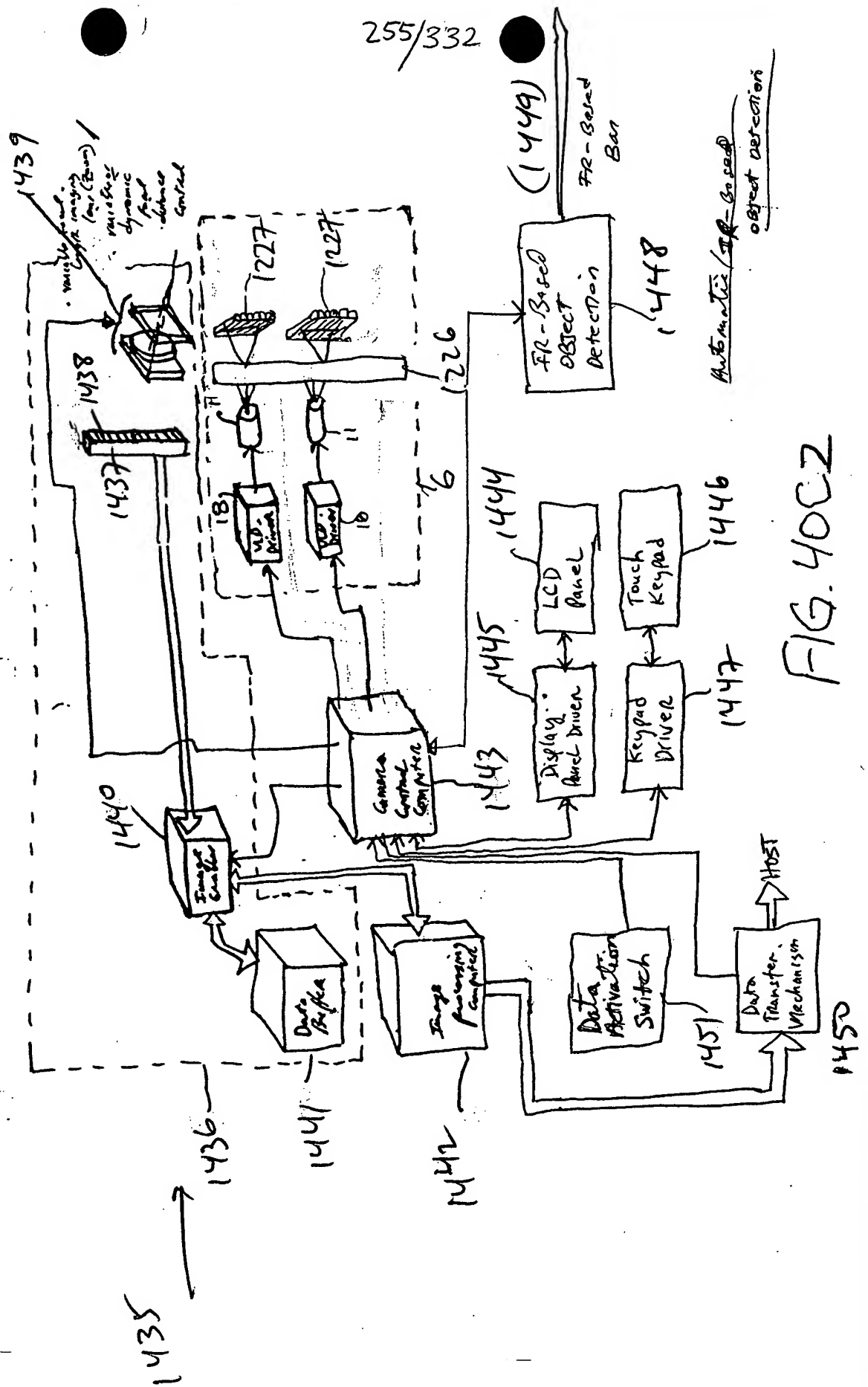
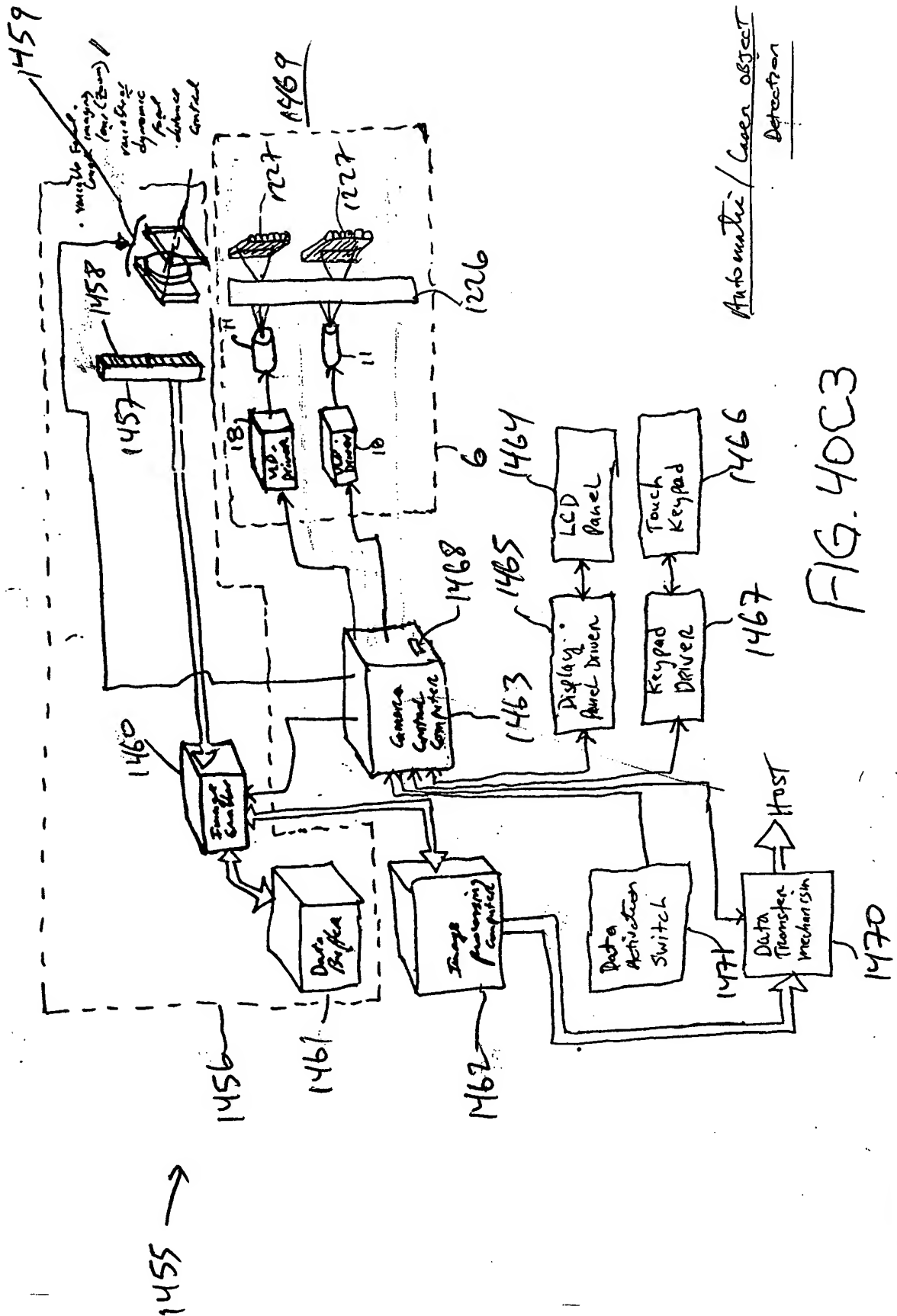


FIG. 40C2

FIG. 40C3



Automatic / Camera Object Detection

FIG. 40C3

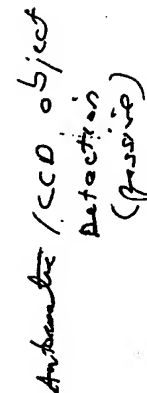
$$257/332$$


FIG. 40C4

1490

1495 →

1499

1509

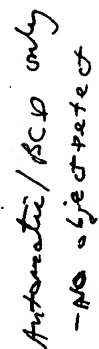


FIG. 40C5

0151

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1-D
display
...

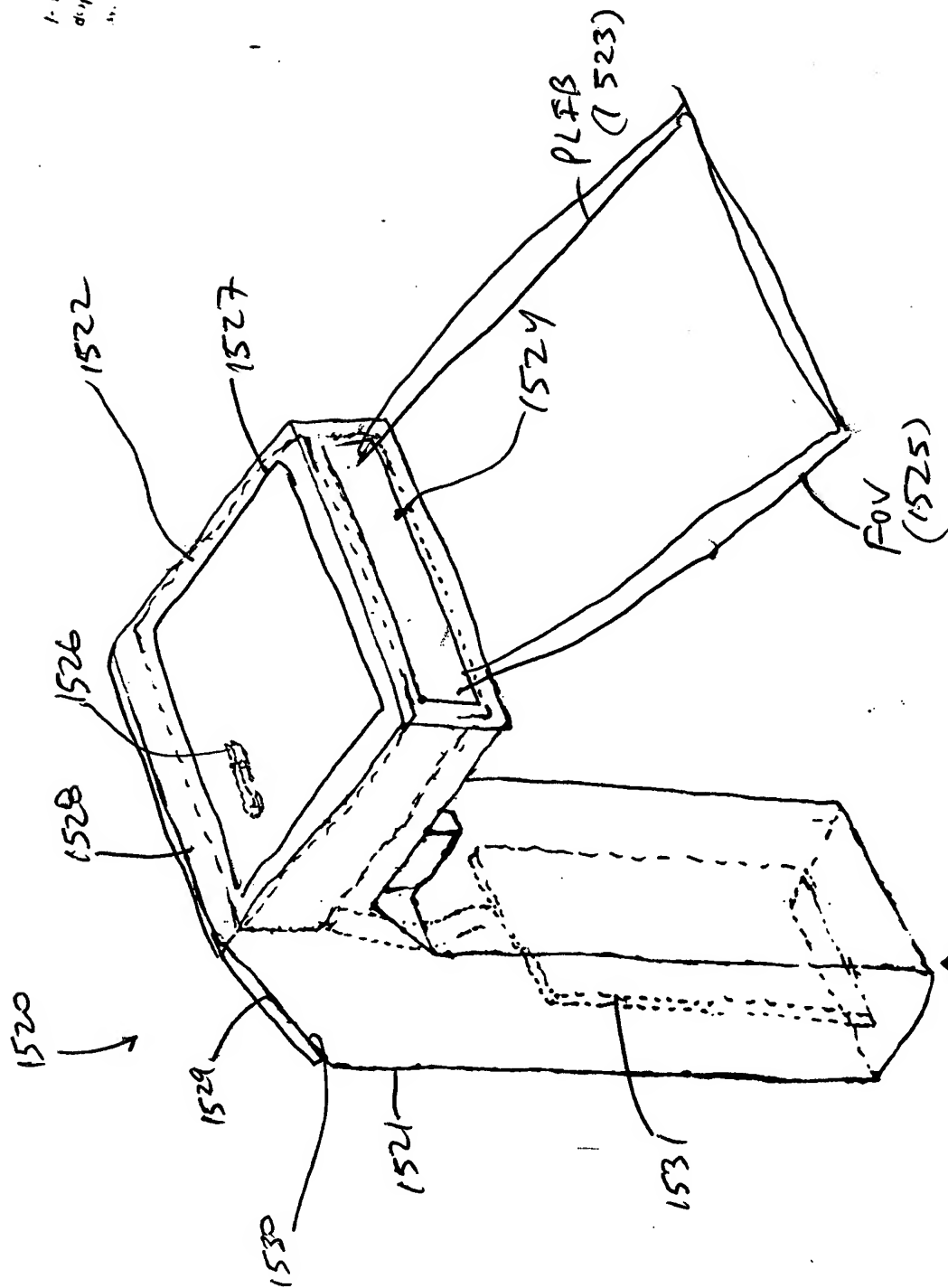


FIG. 41A

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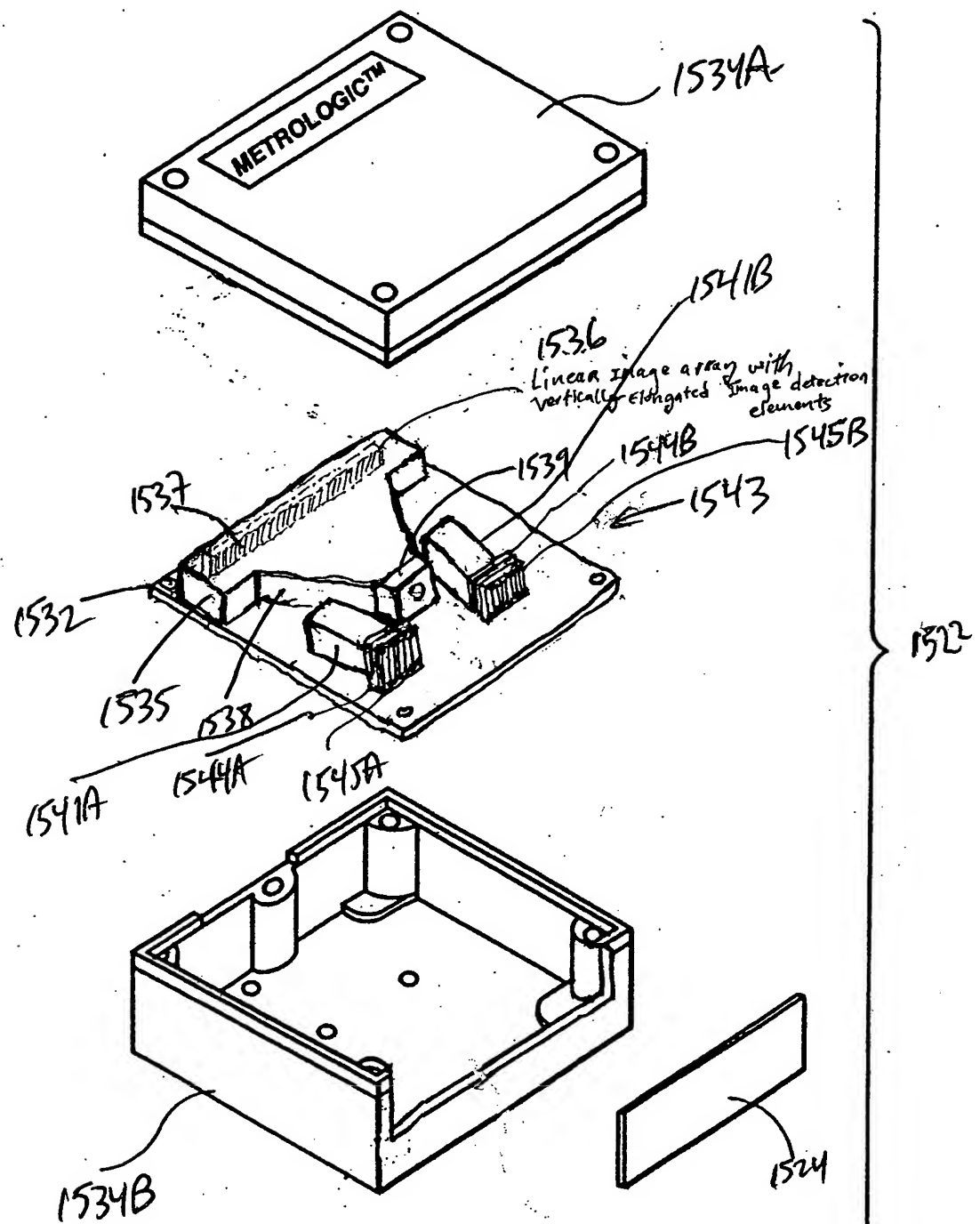


FIG. 41B

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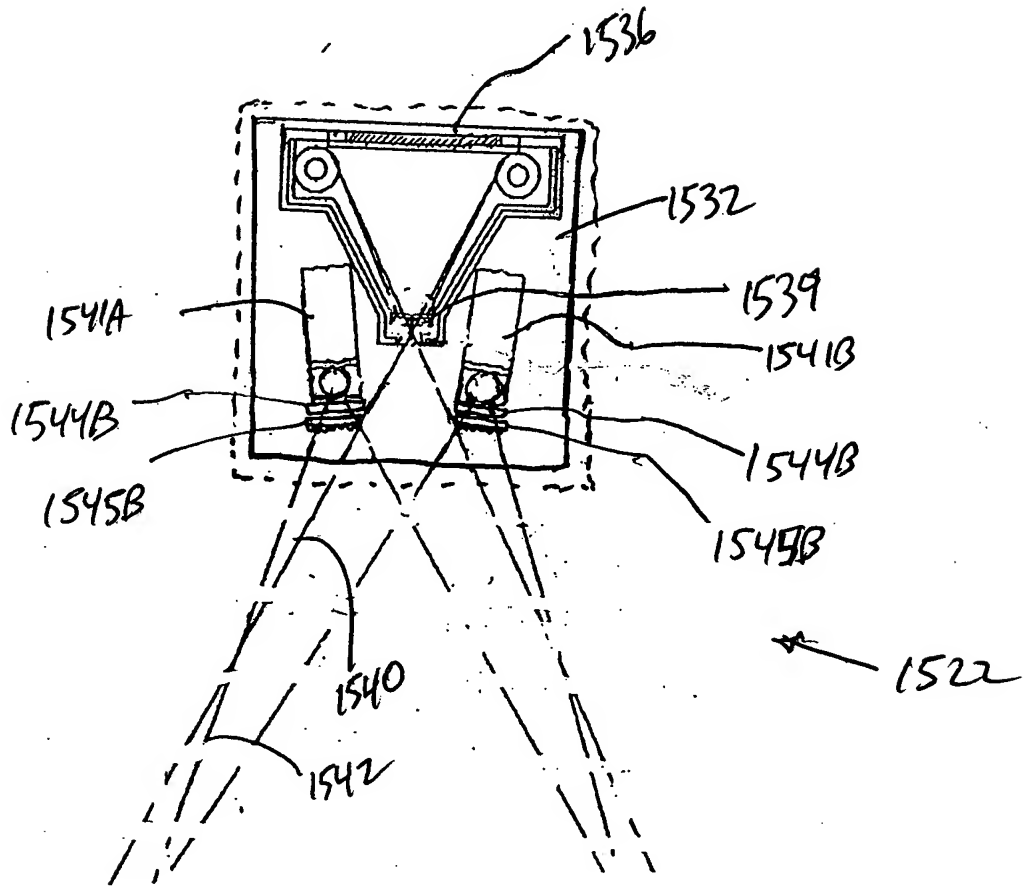


FIG. 41C

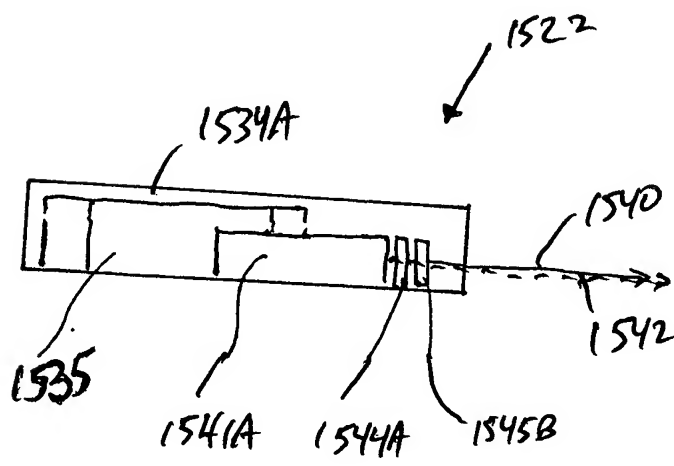


FIG. 41D

20000101525007

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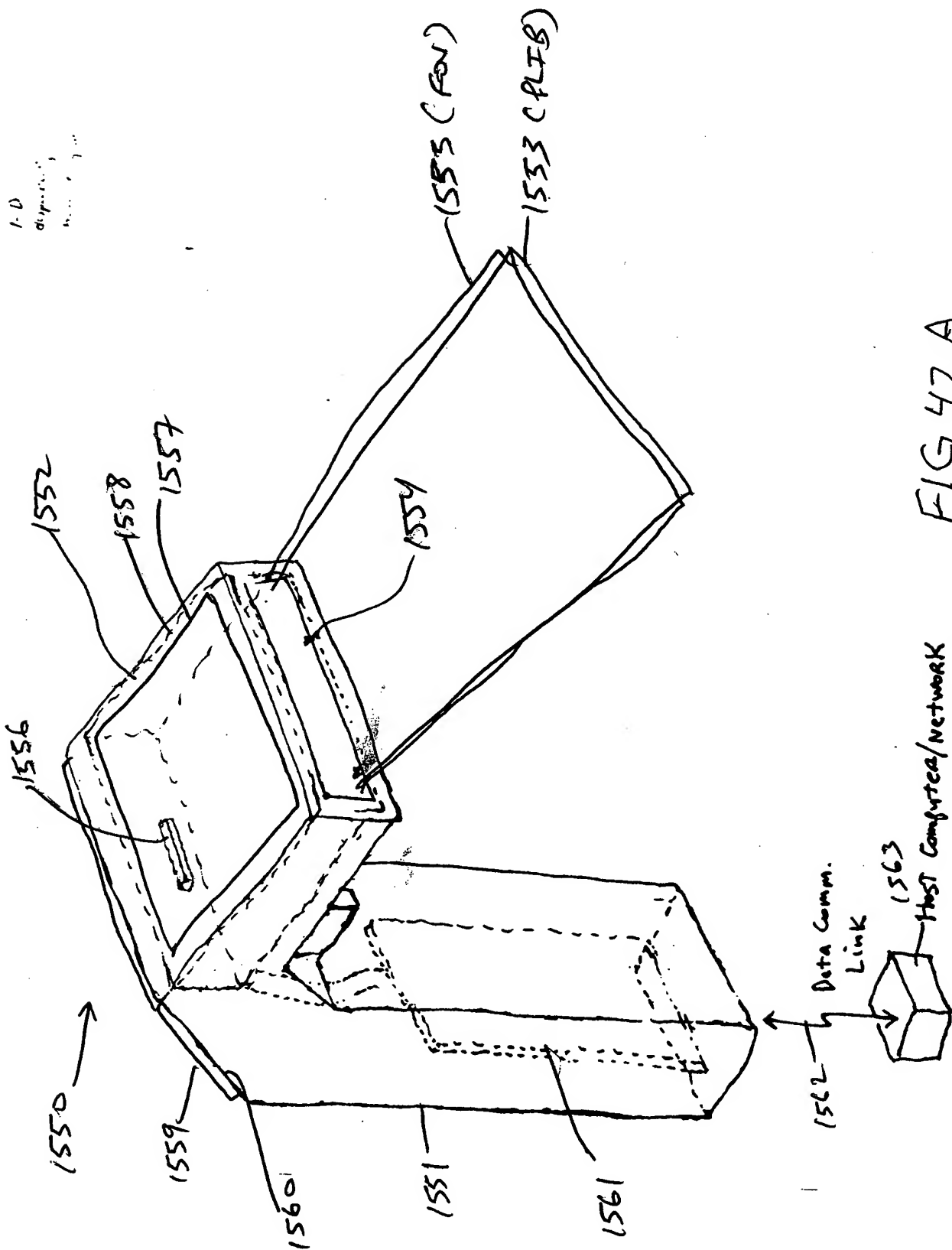


FIG. 42A

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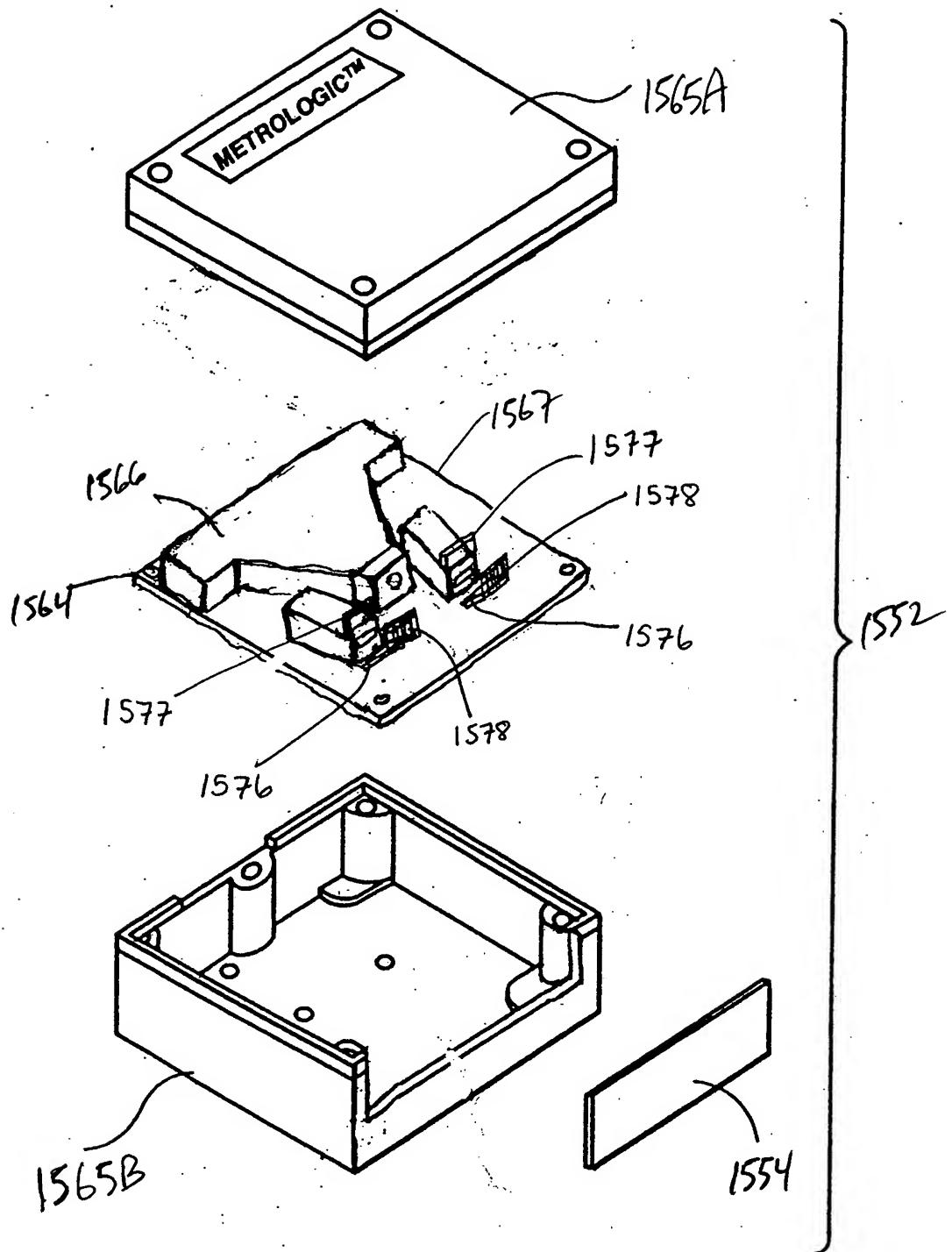


FIG. 42B

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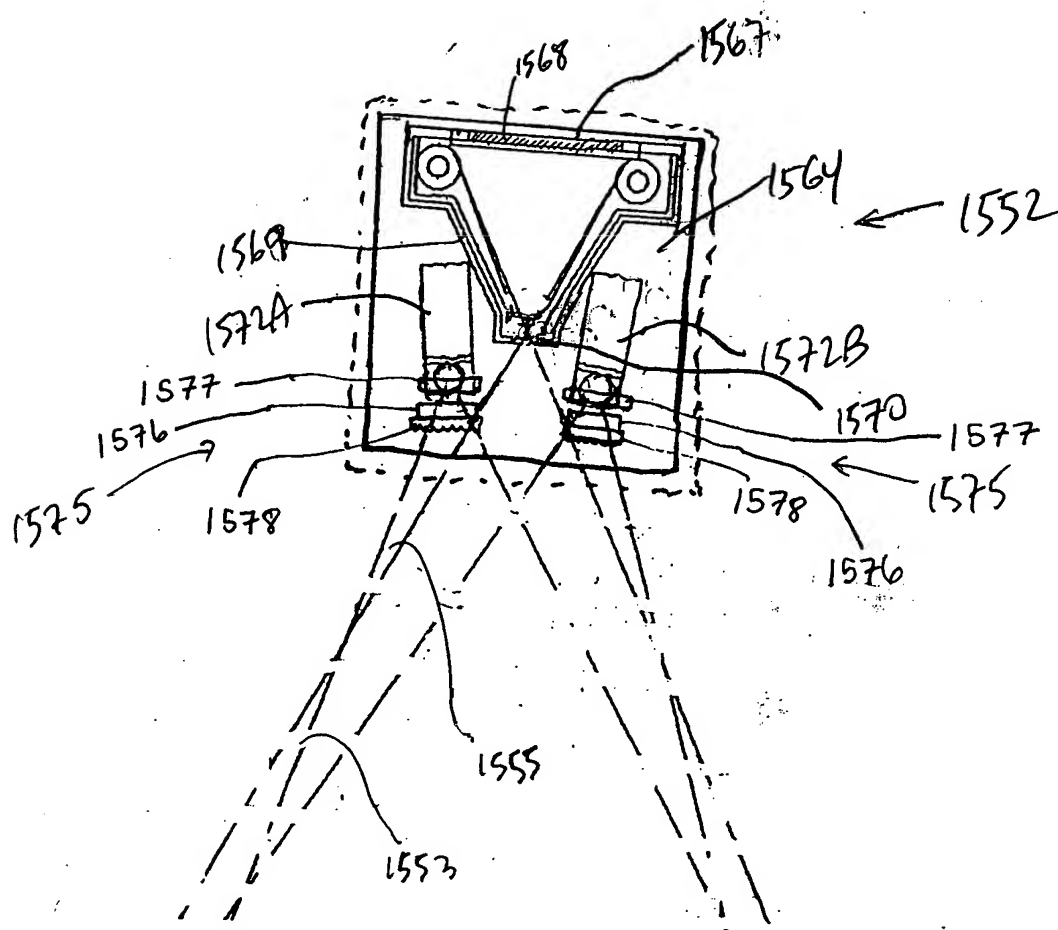


FIG. 42C

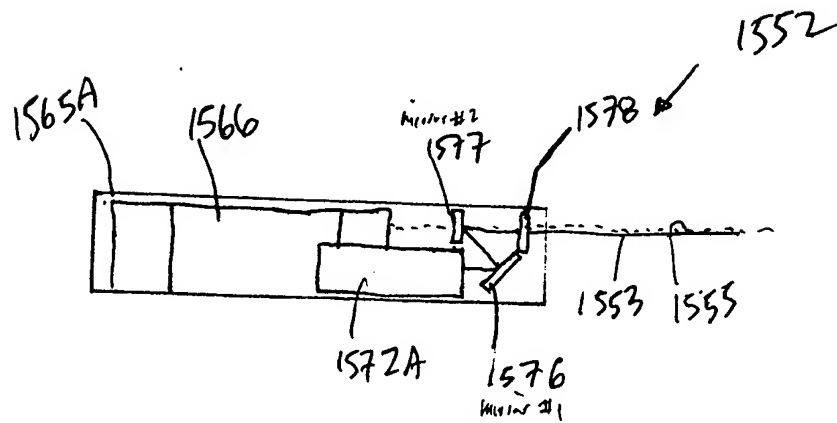


FIG. 42D

1-D
despising;
despising;



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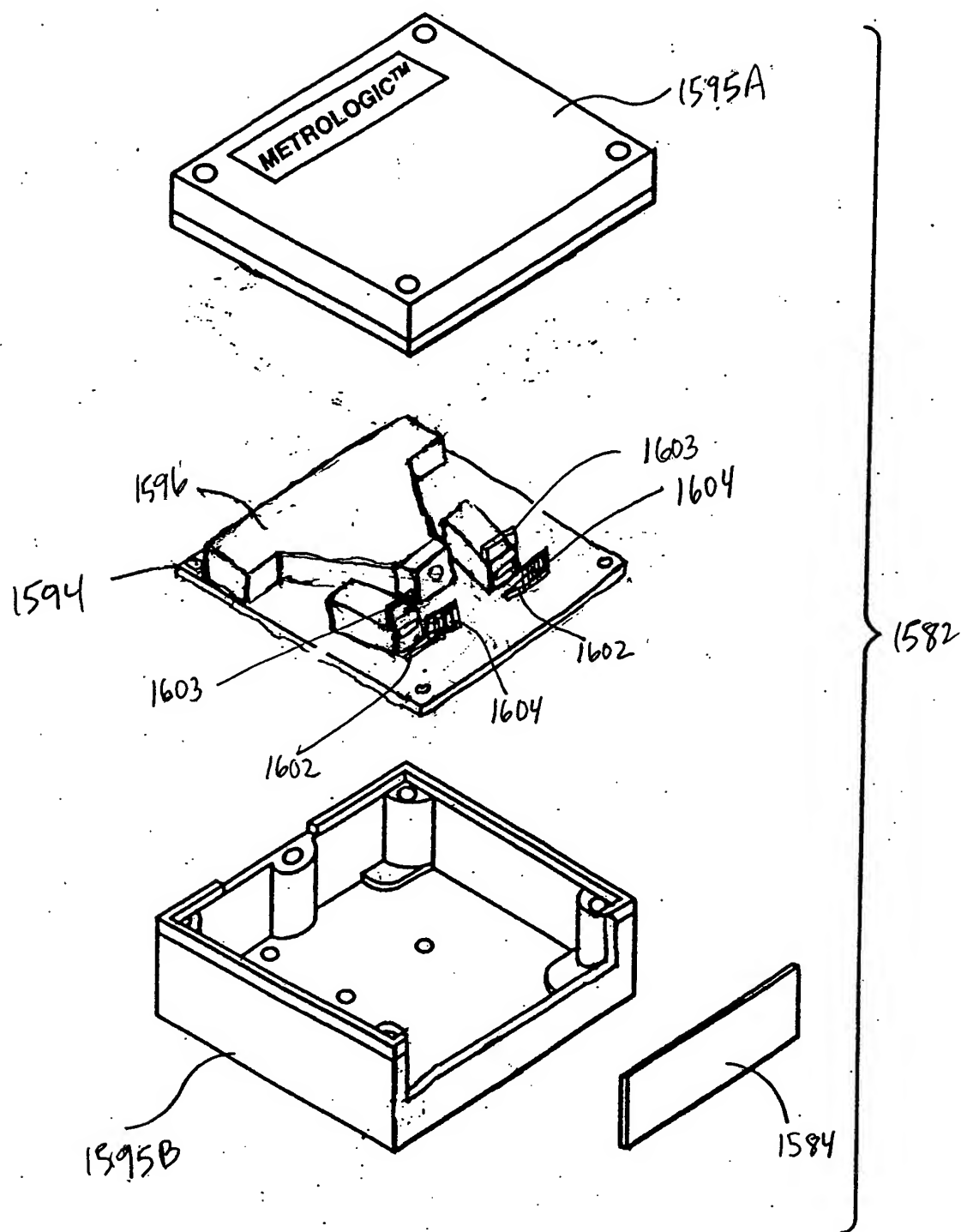


FIG. 43B

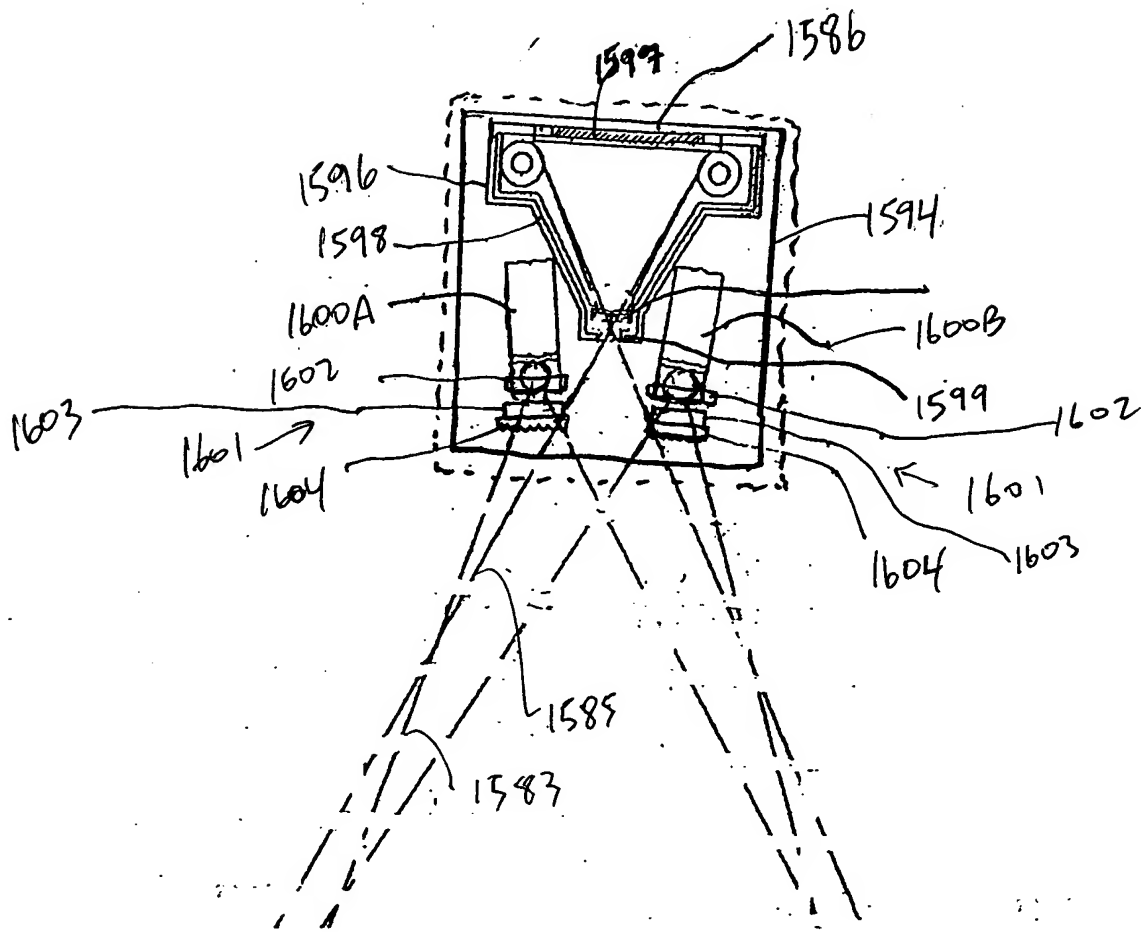


FIG. 43C

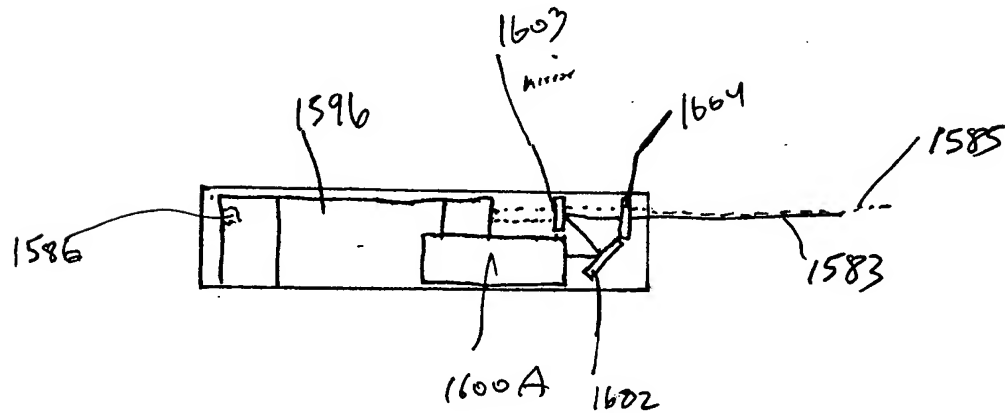


FIG. 43D

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20000323000

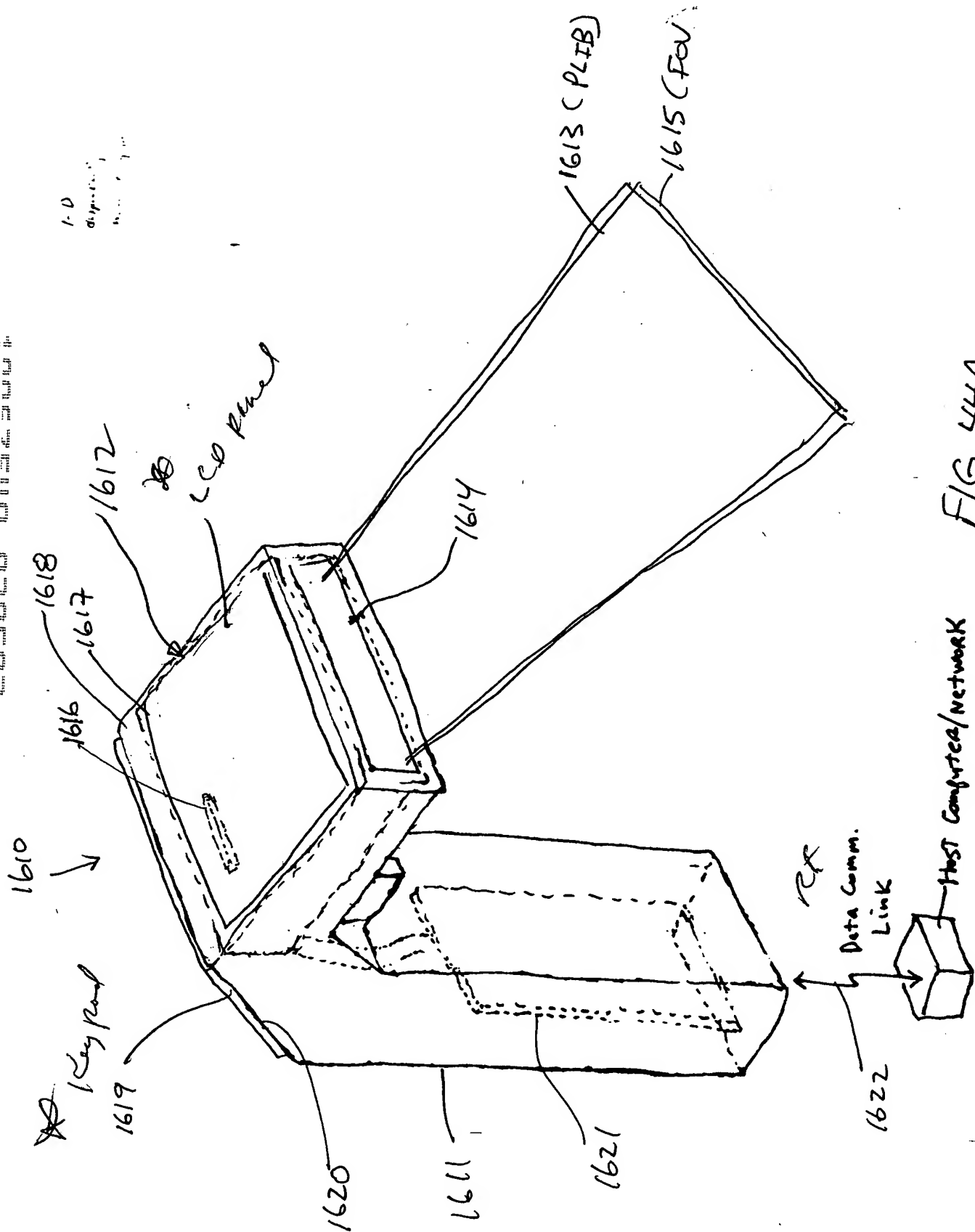


FIG. 44A

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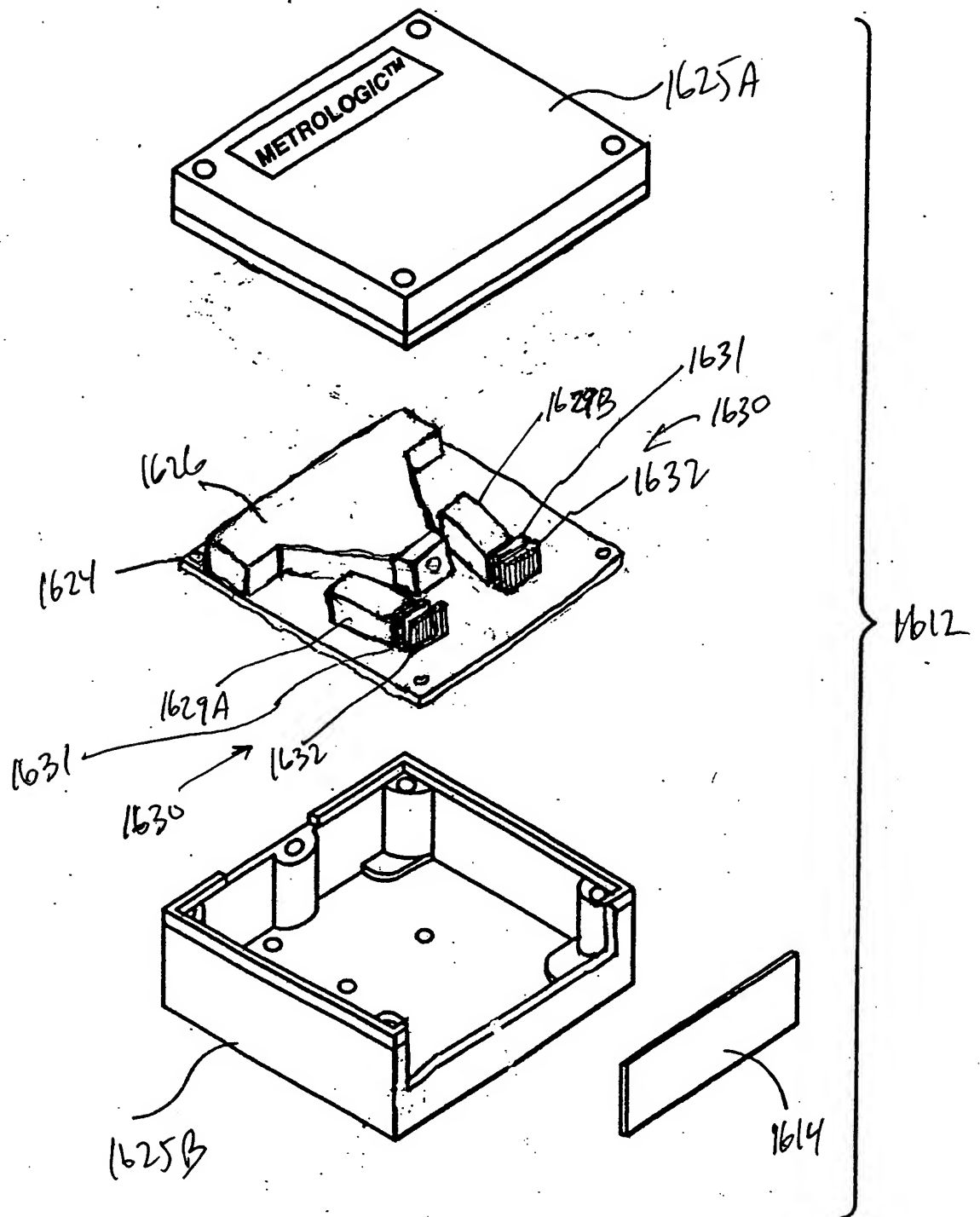


FIG. 44B

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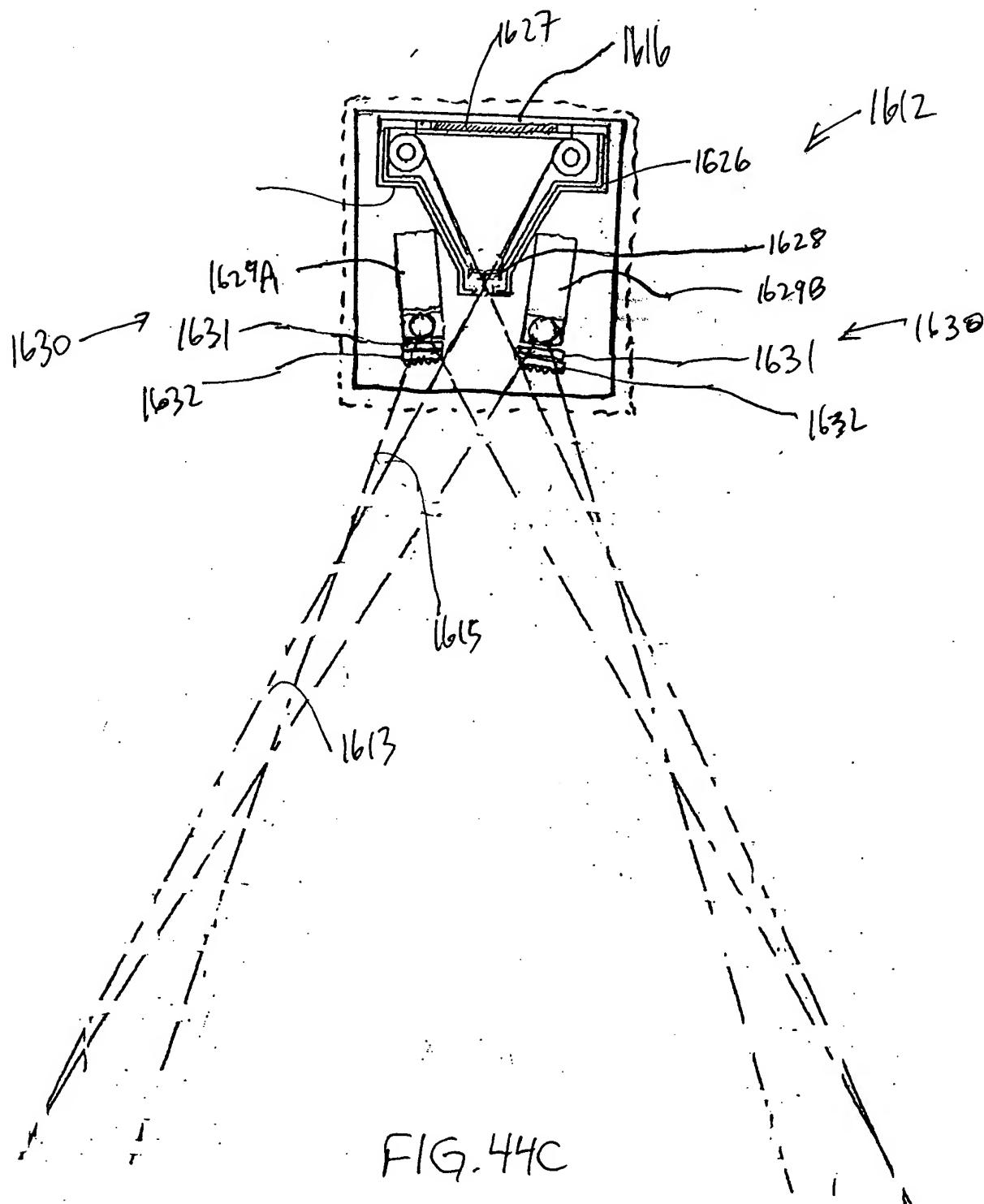


FIG. 44C

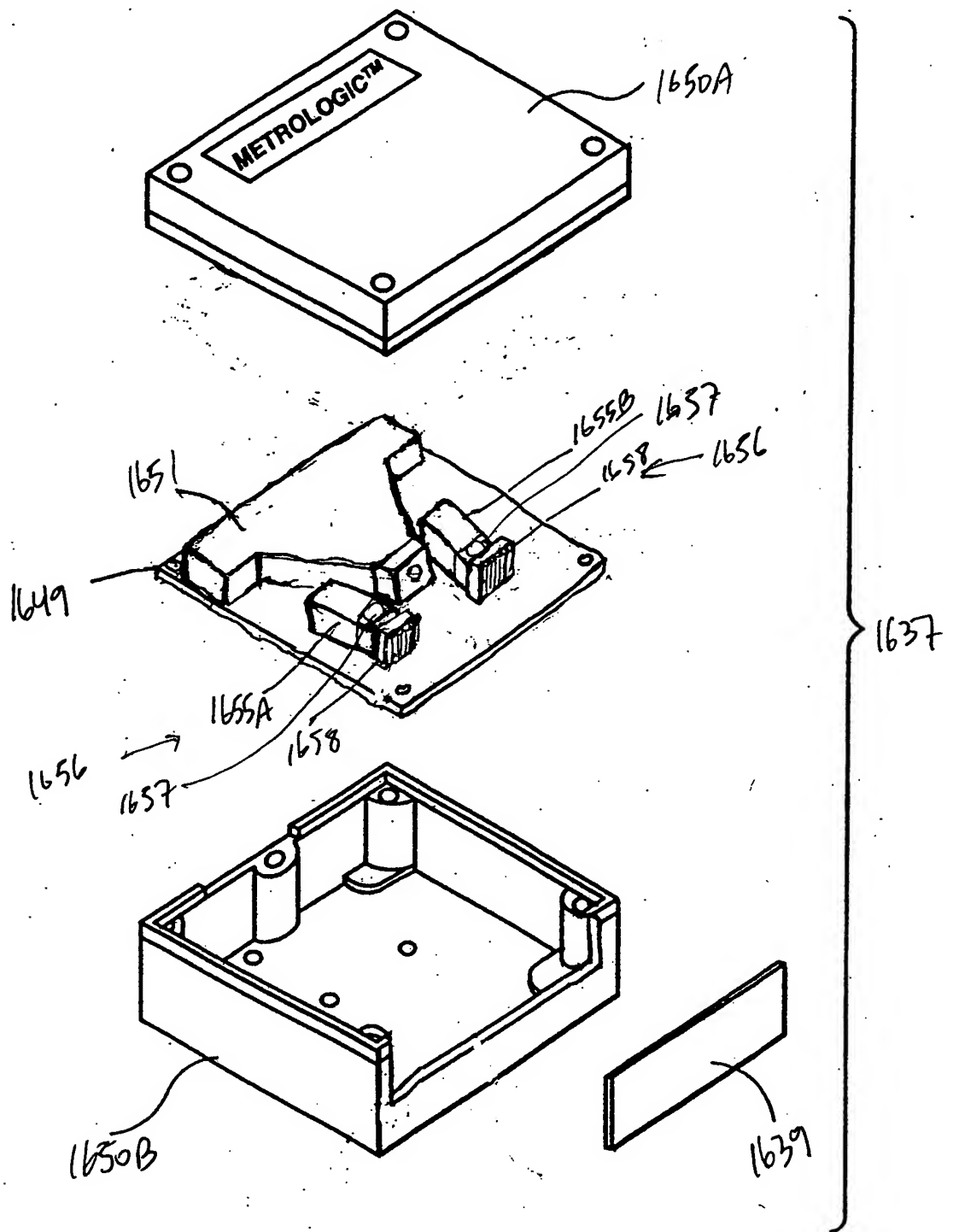


FIG. 45B

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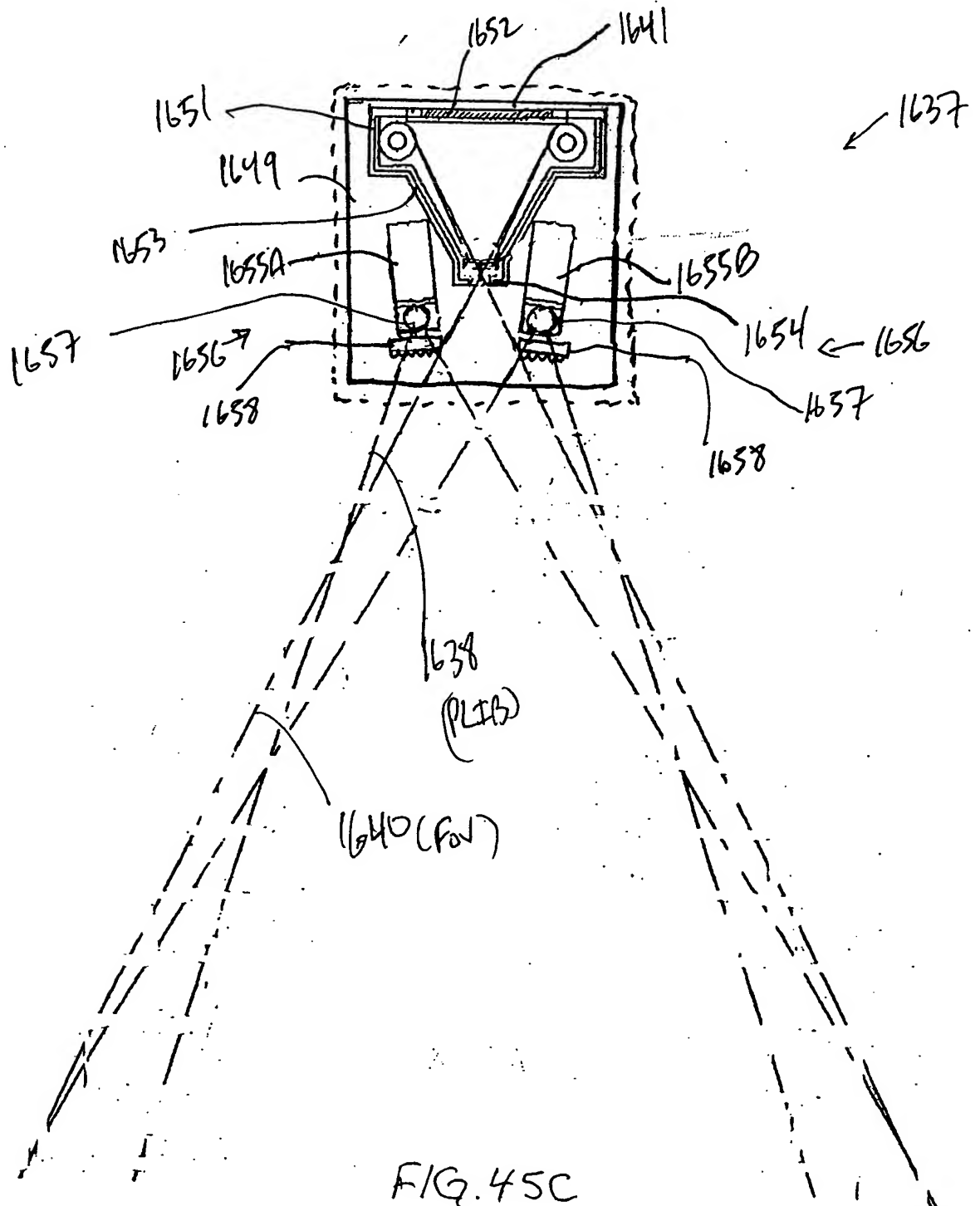


FIG. 45C

2025-01-15 10:00:00

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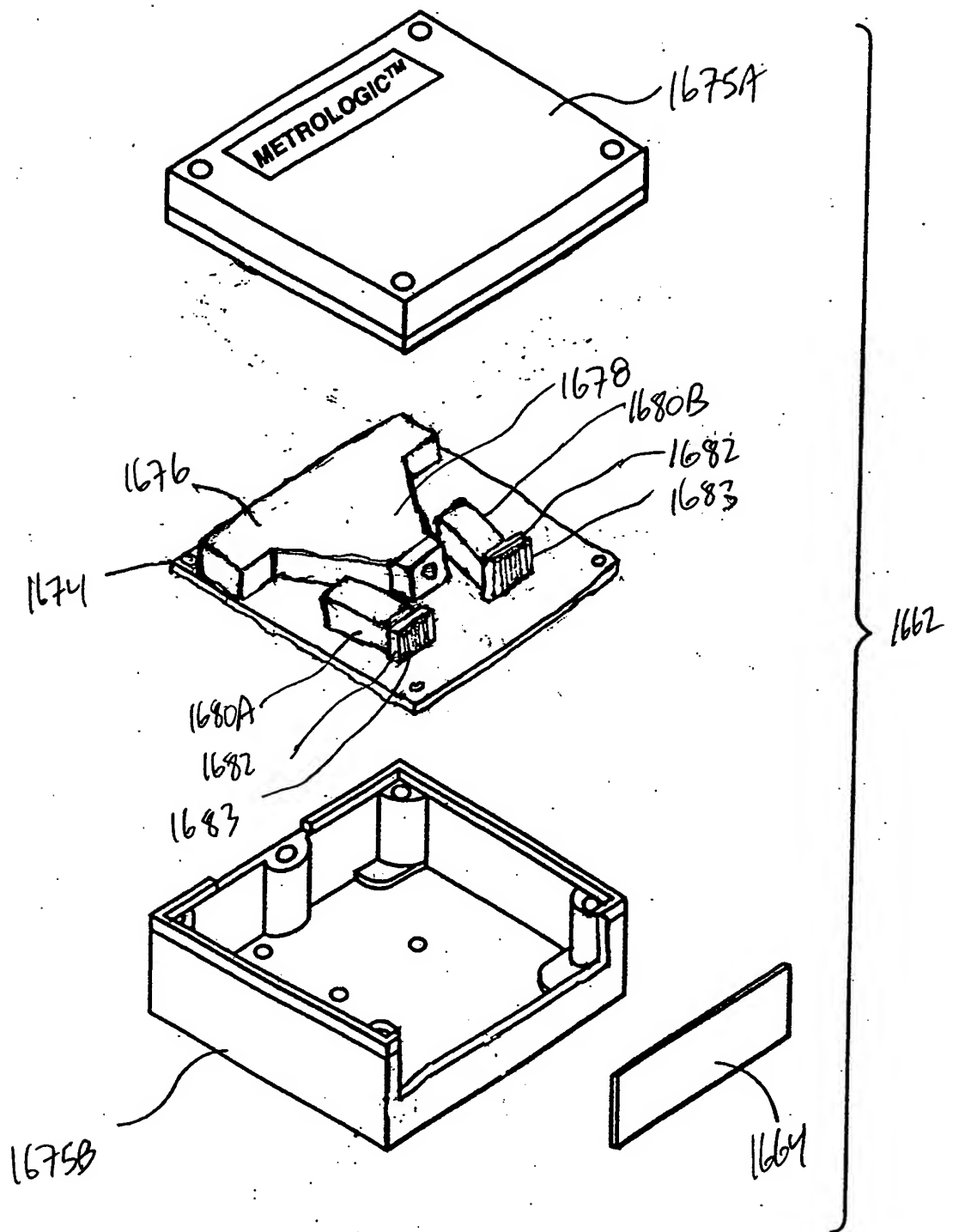


FIG. 46B

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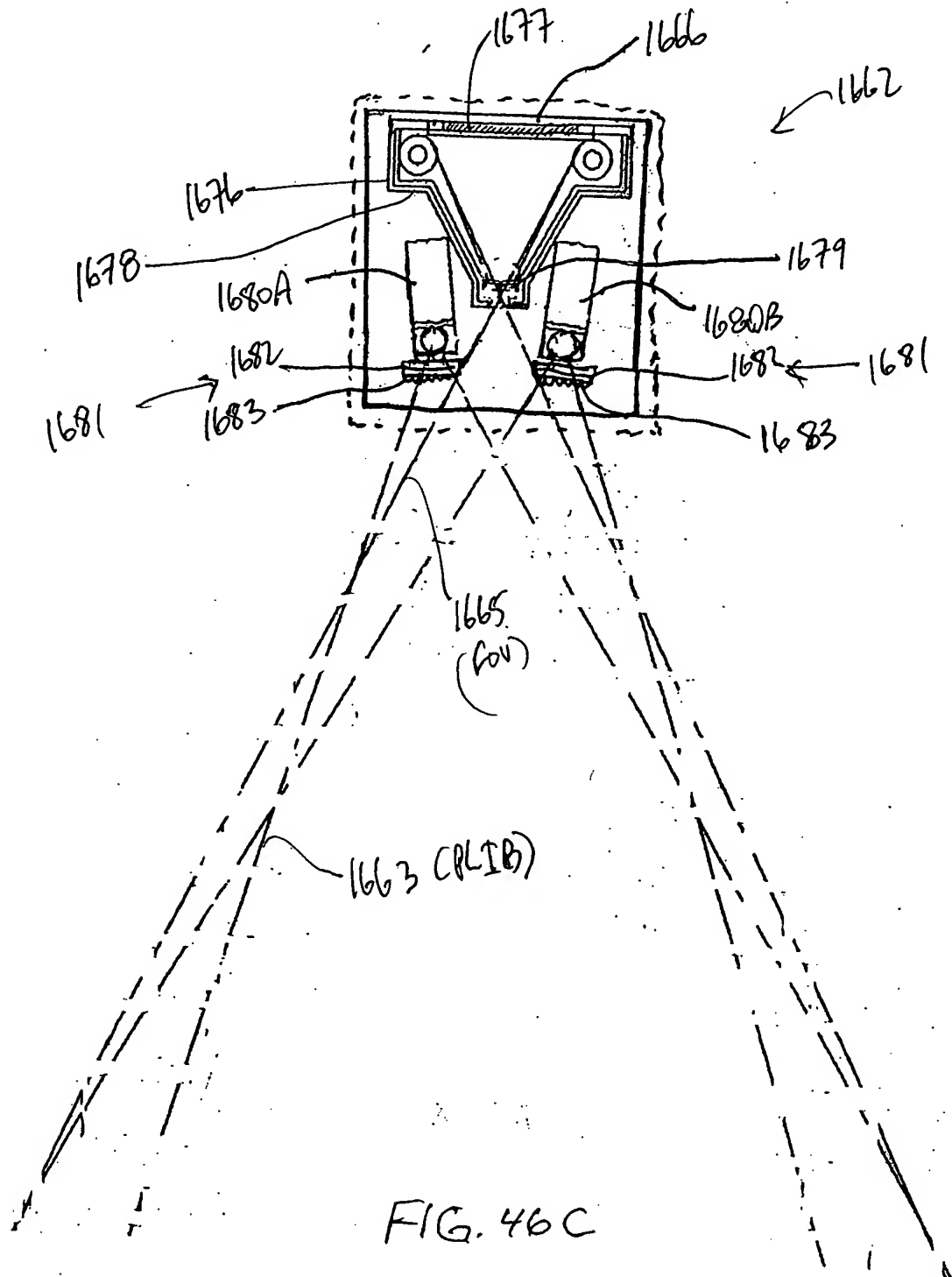


FIG. 46C

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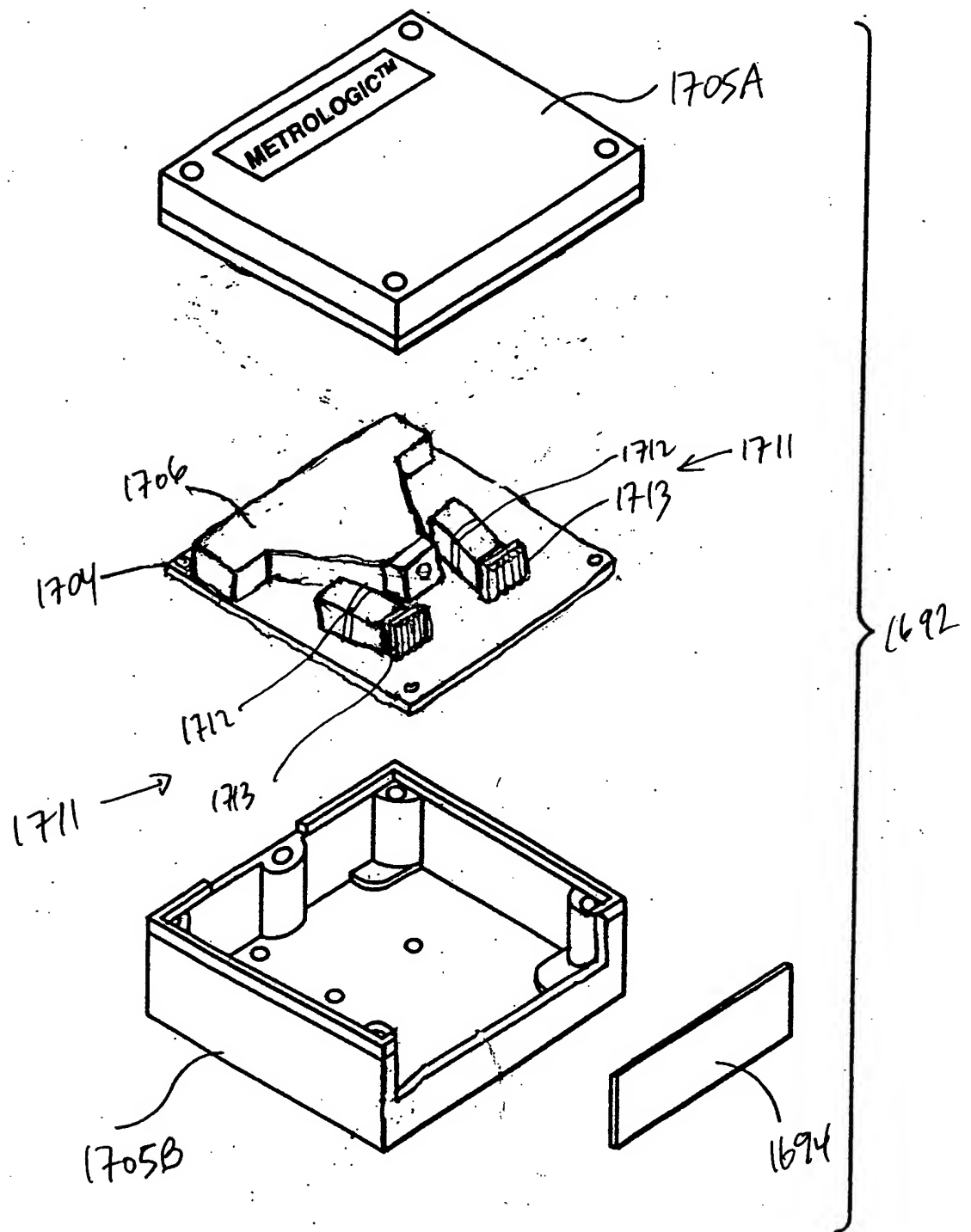
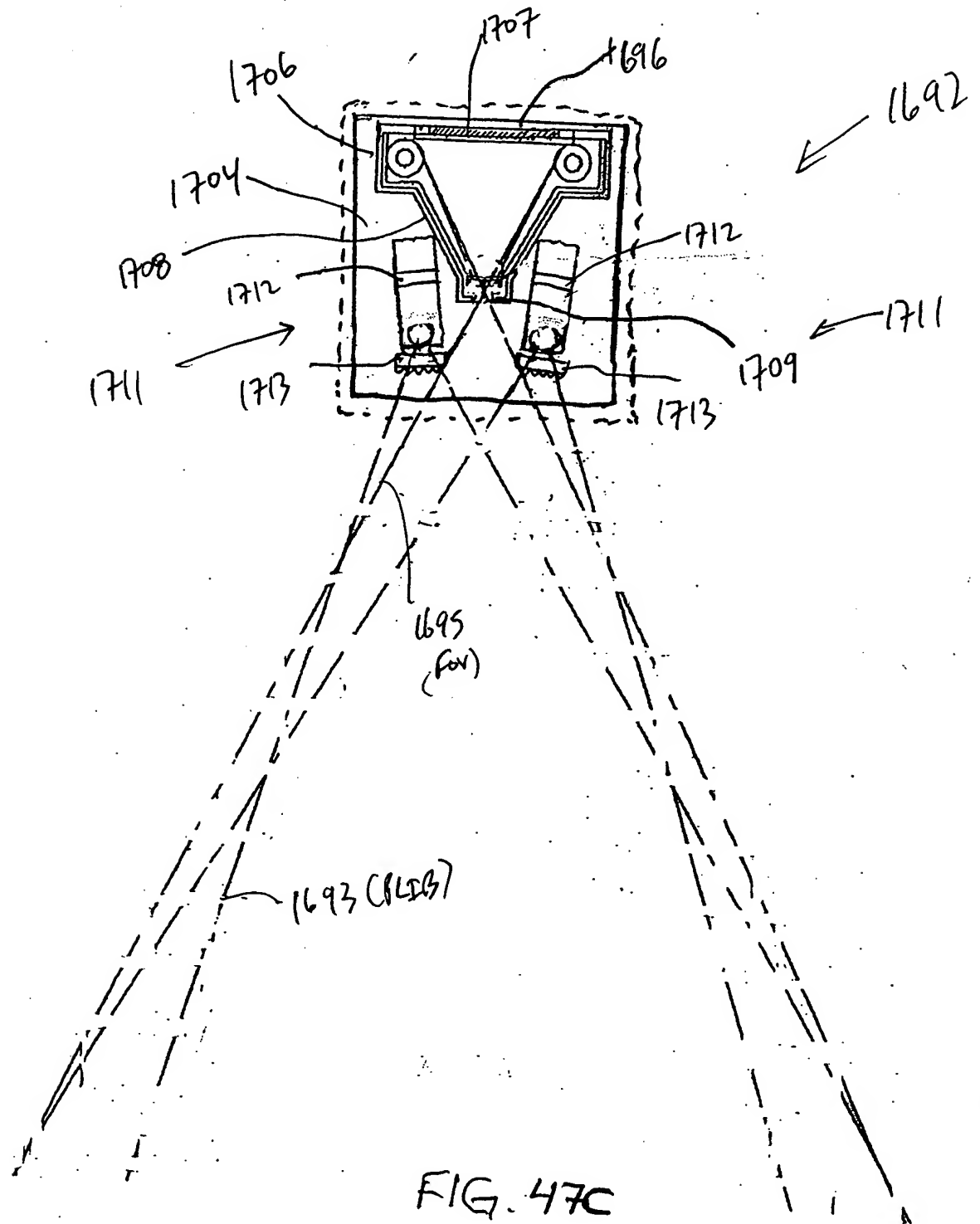


FIG. 47B

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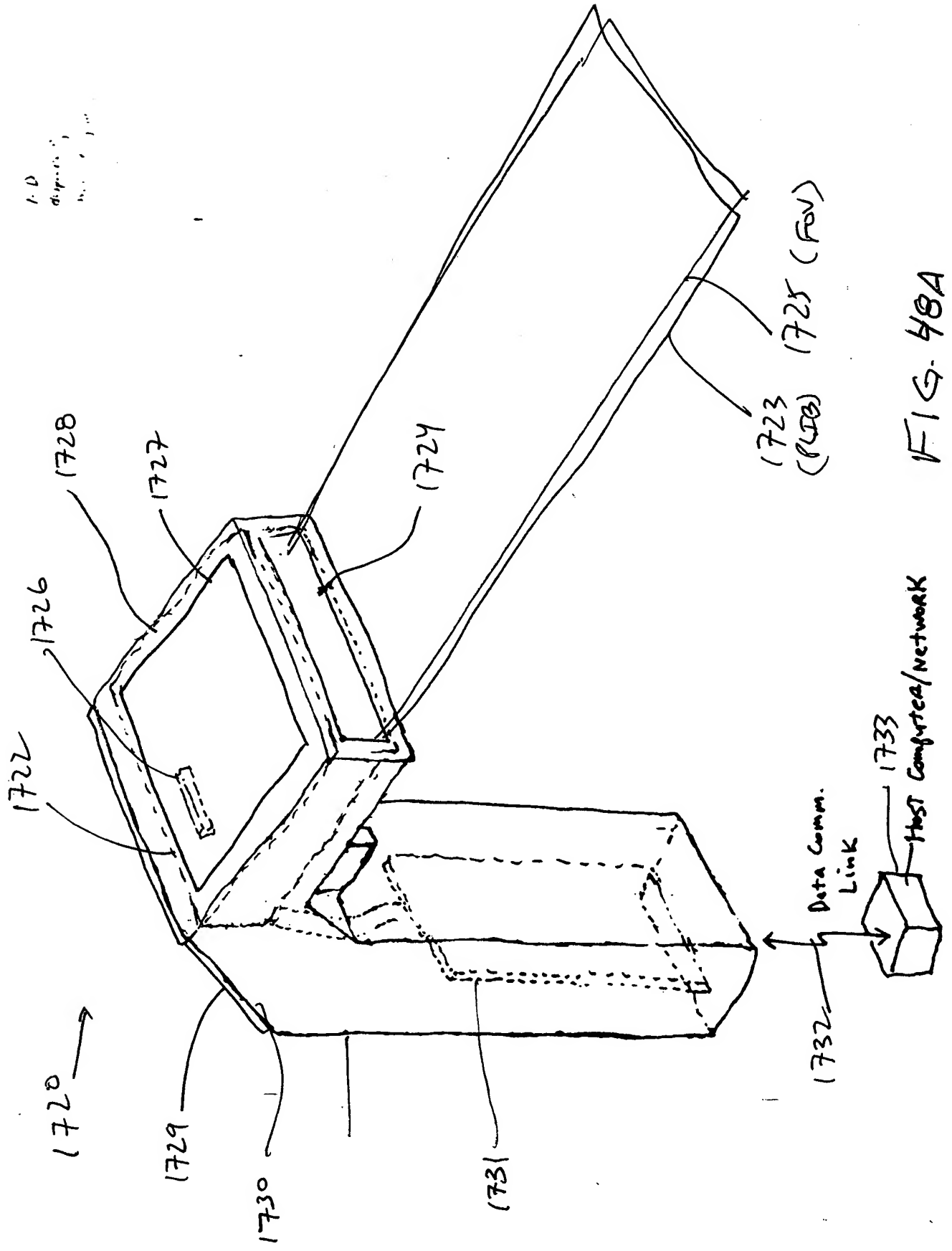


FIG. 48A

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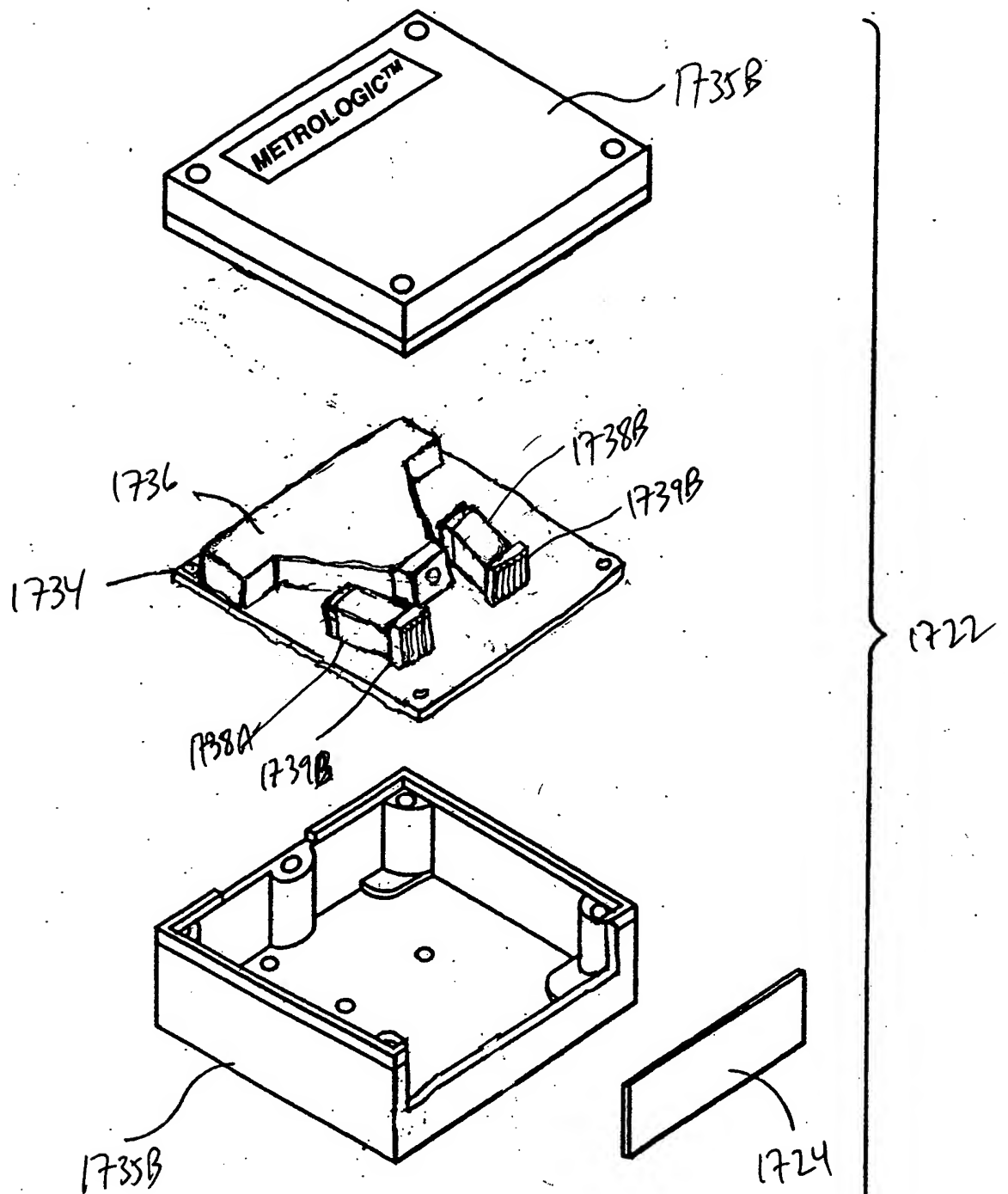


FIG. 48B

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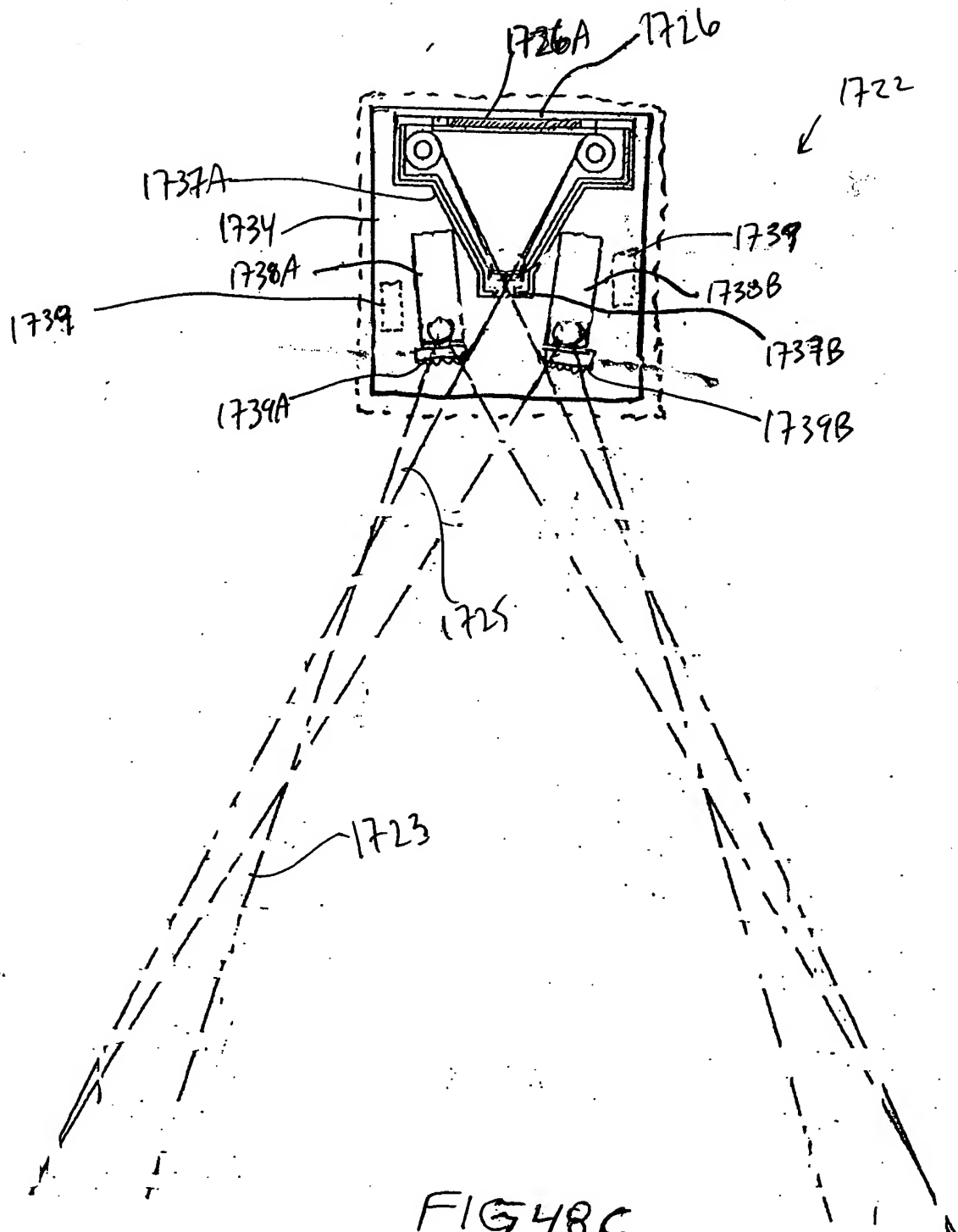
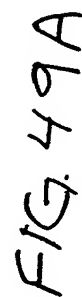


FIG. 48C

2025 RELEASE UNDER E.O. 14176

1-D
disposition;
... ..



Host Computer/Network

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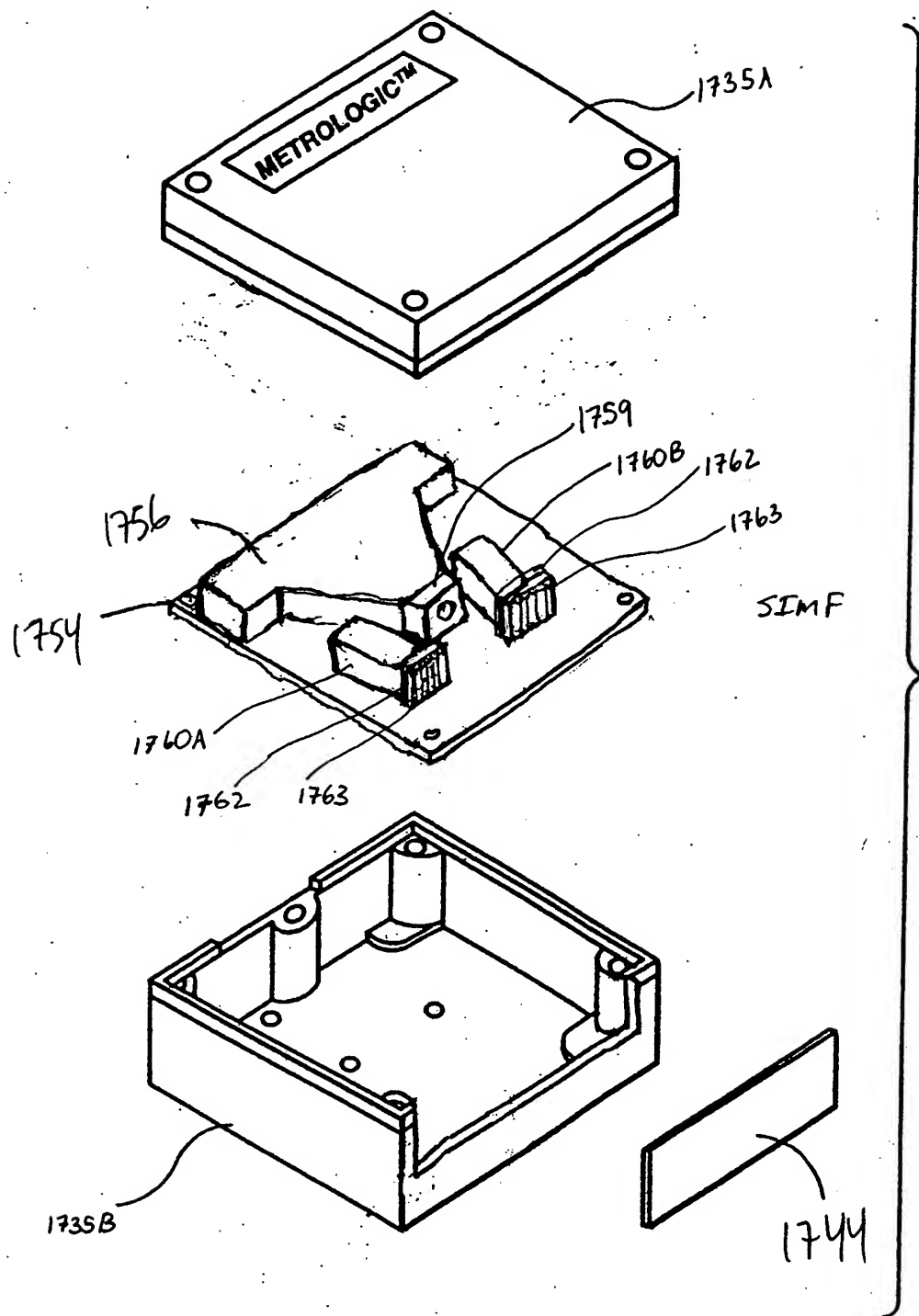


FIG. 49B

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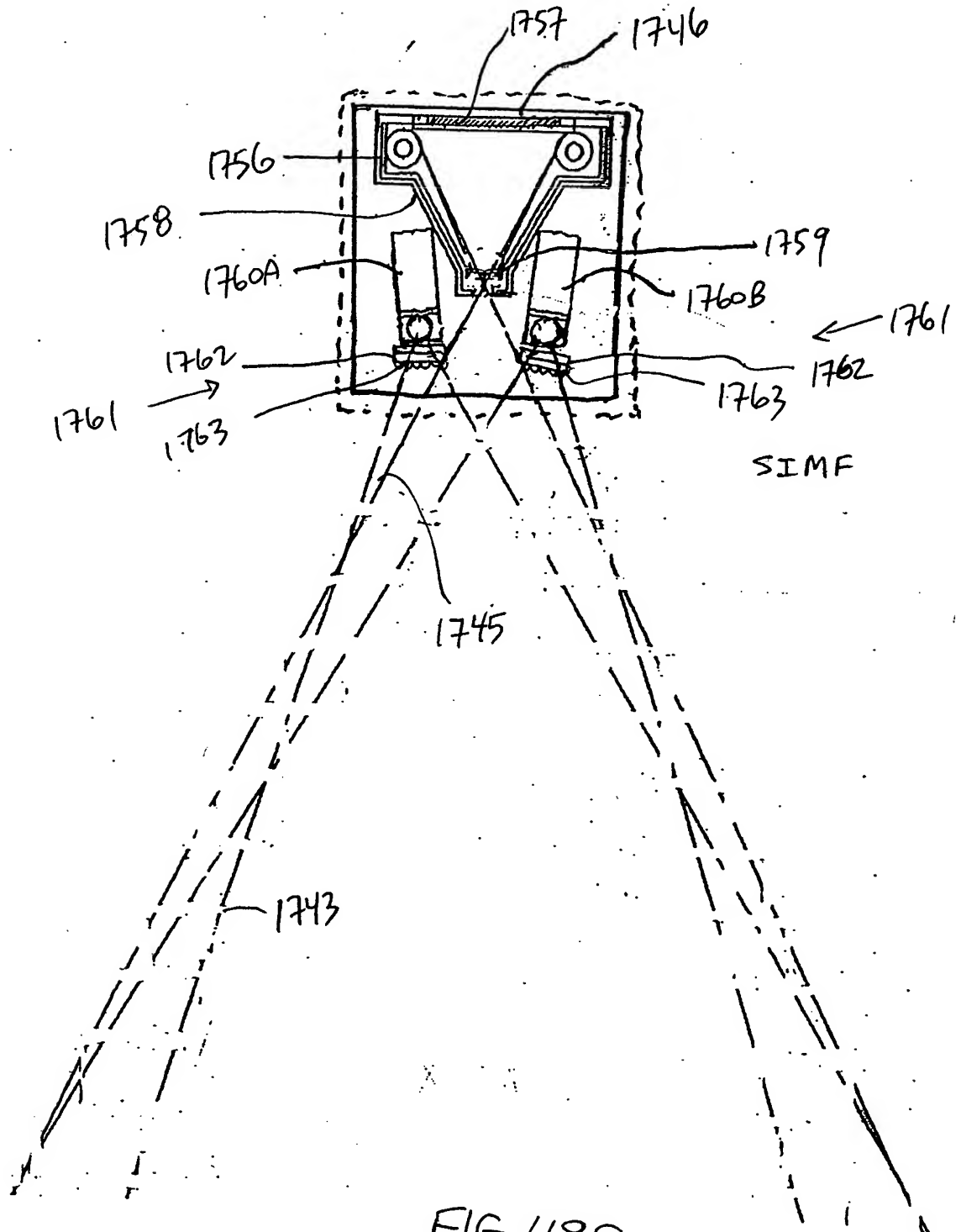


FIG. 49C

1-D
disposition;
nature of

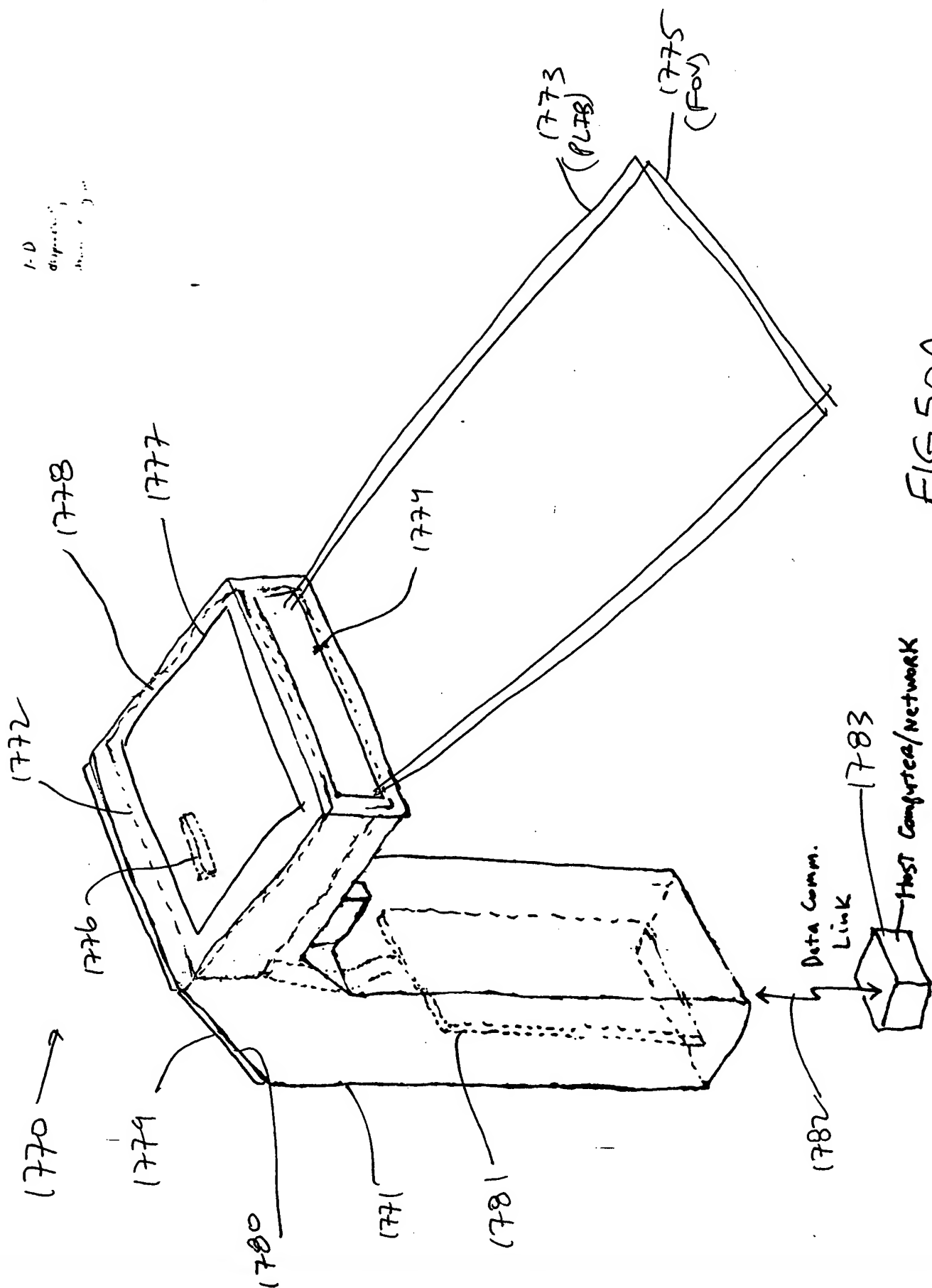


FIG. 50A

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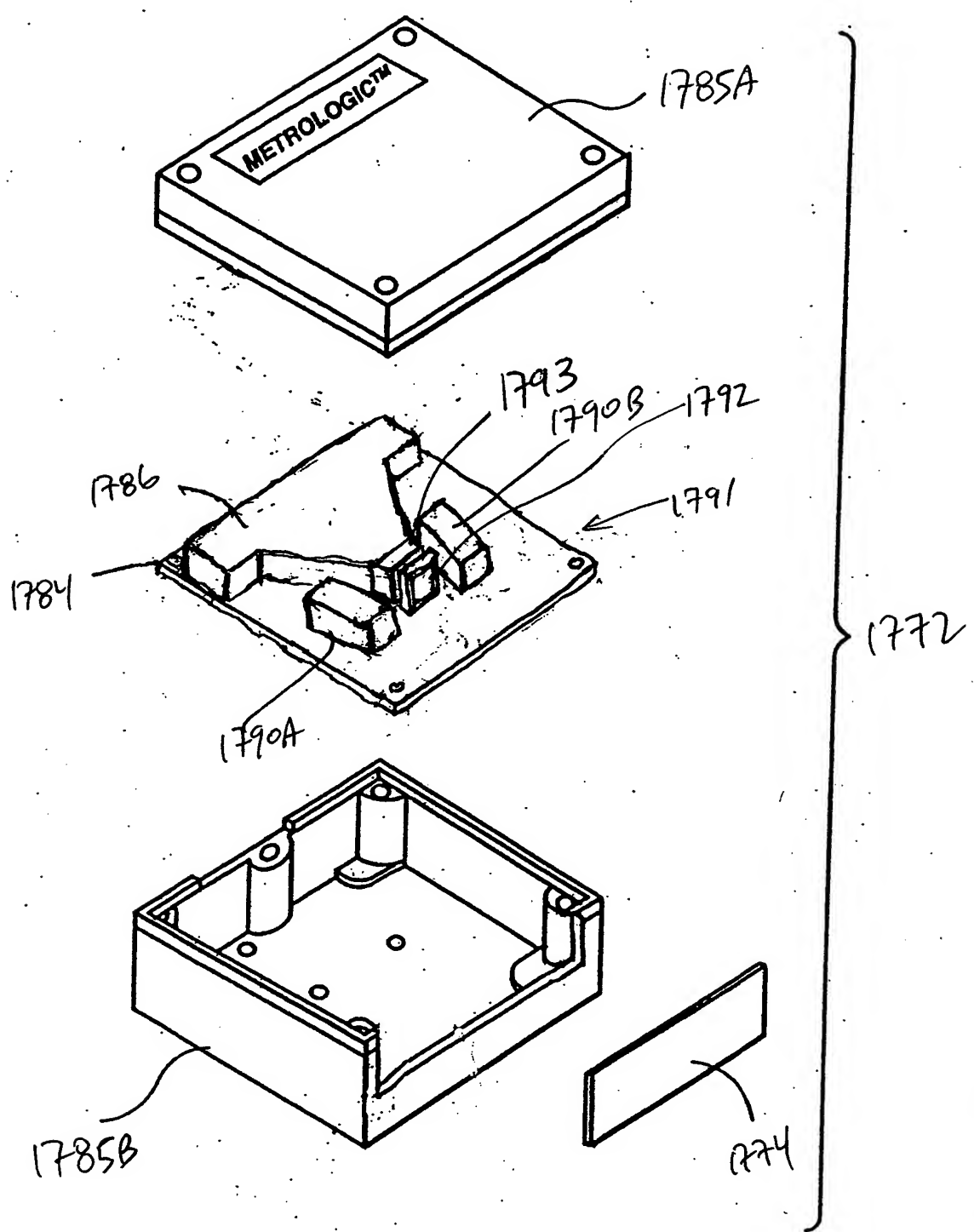


FIG. 50B

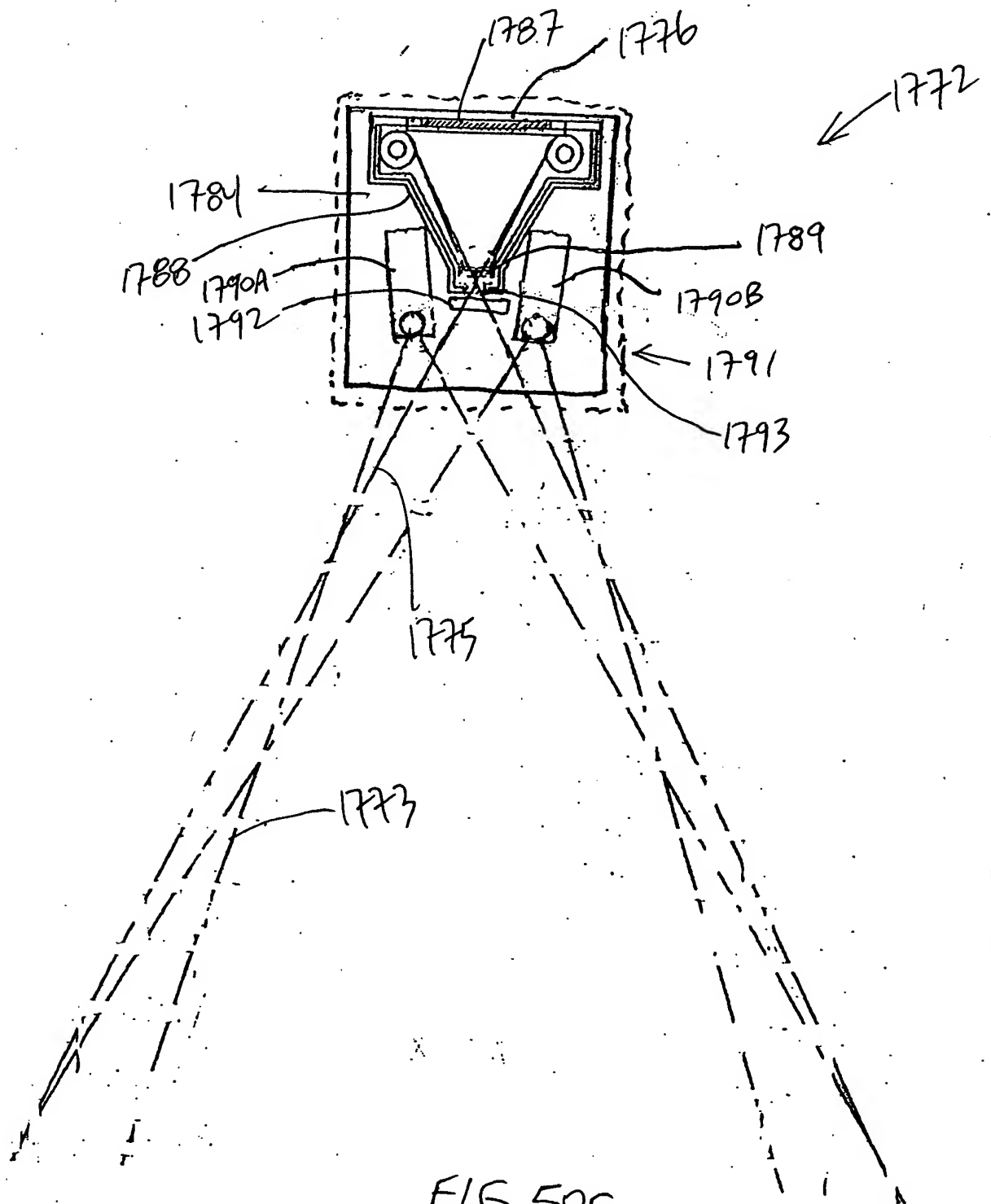


FIG. 50C

1-D
display,
...

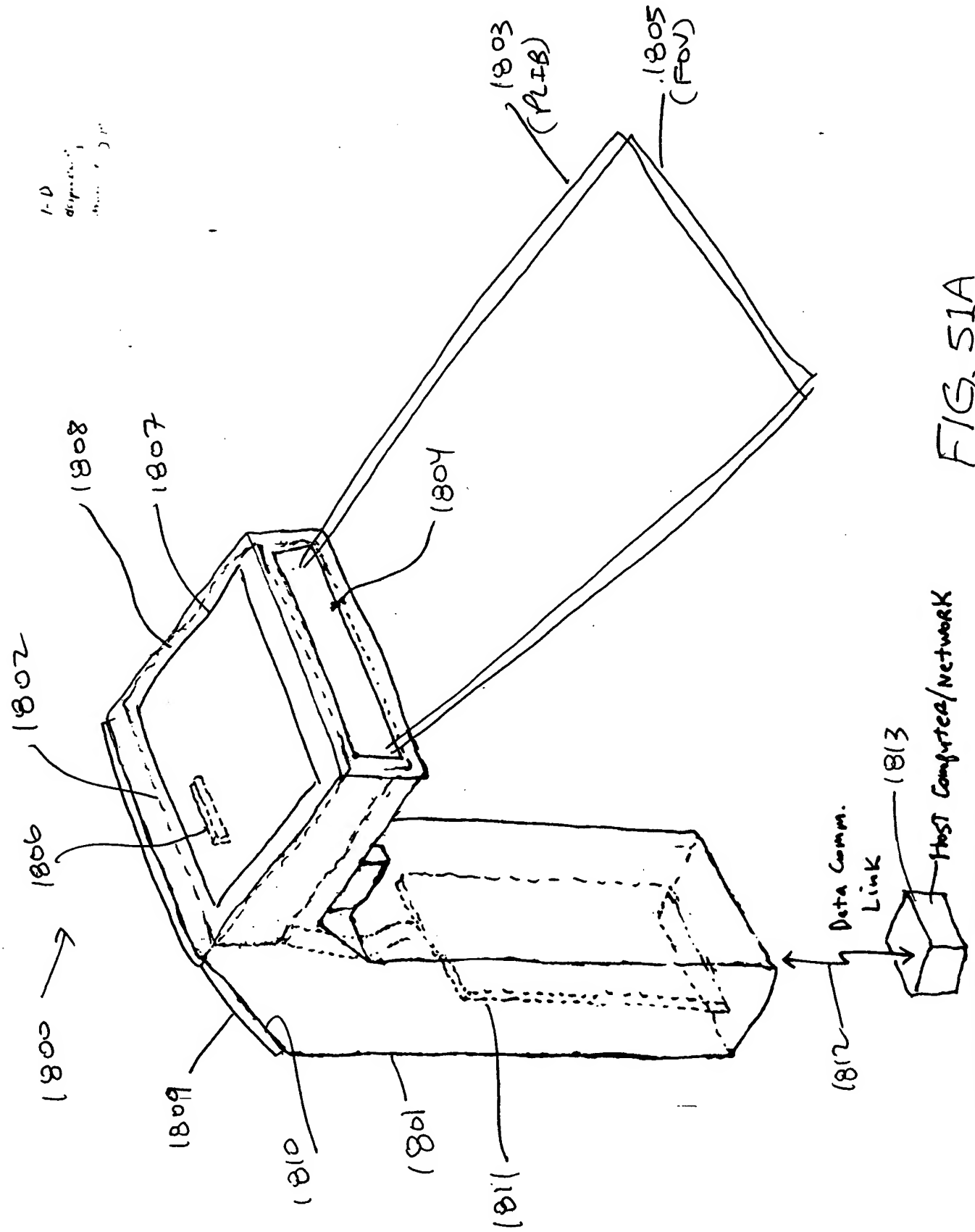


FIG. 51A

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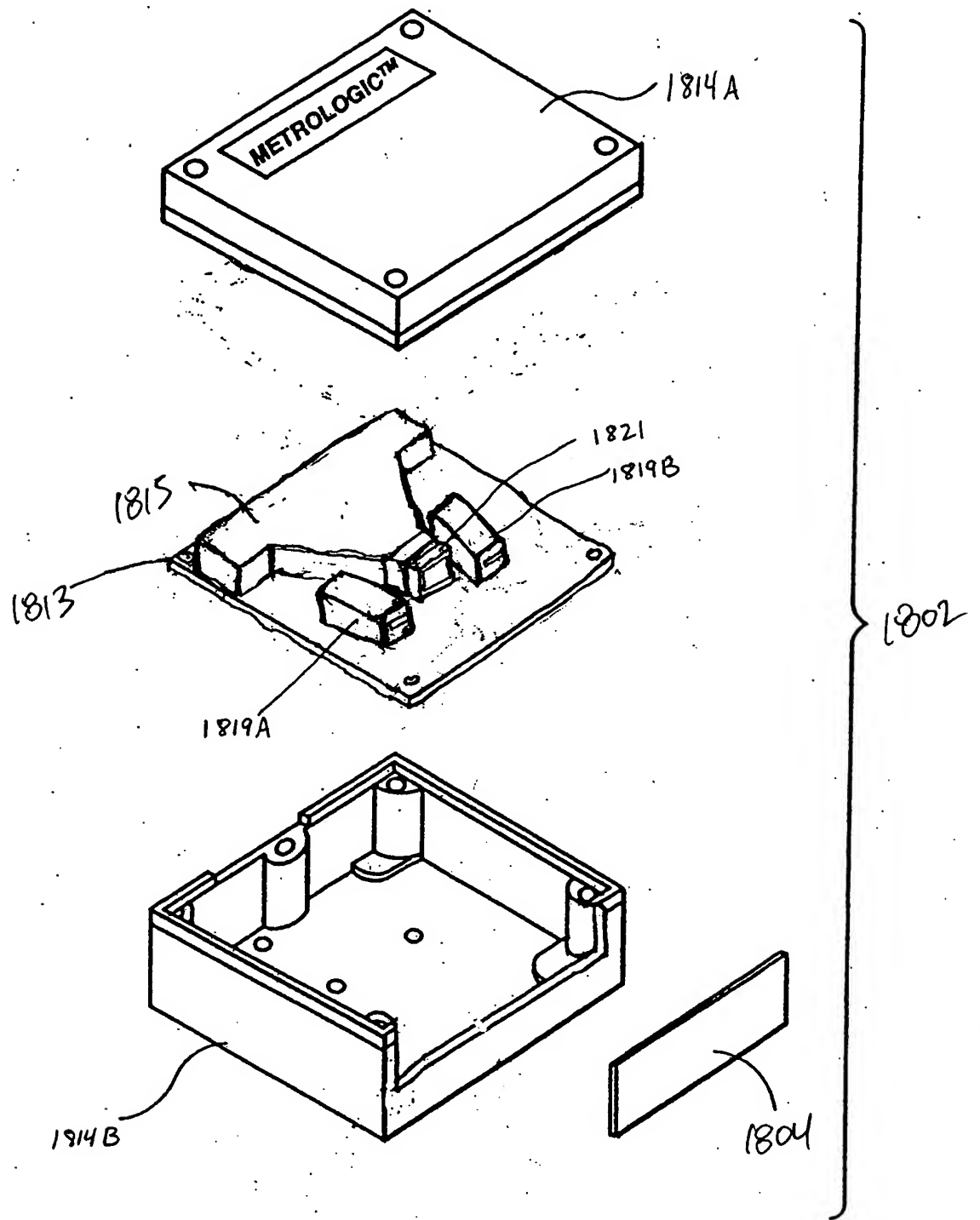


FIG. 51B

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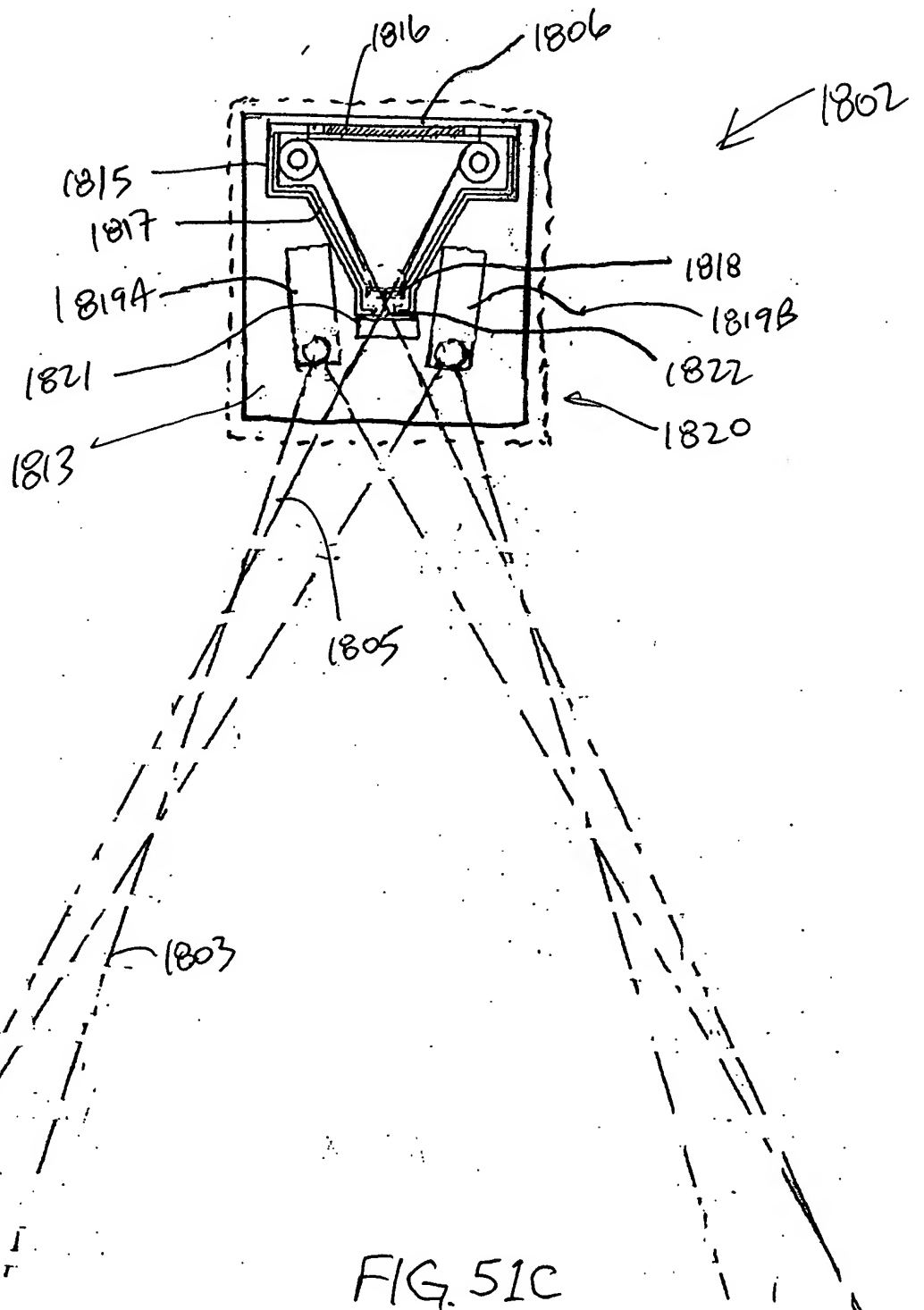


FIG. 51C

2025 RELEASE UNDER E.O. 14176

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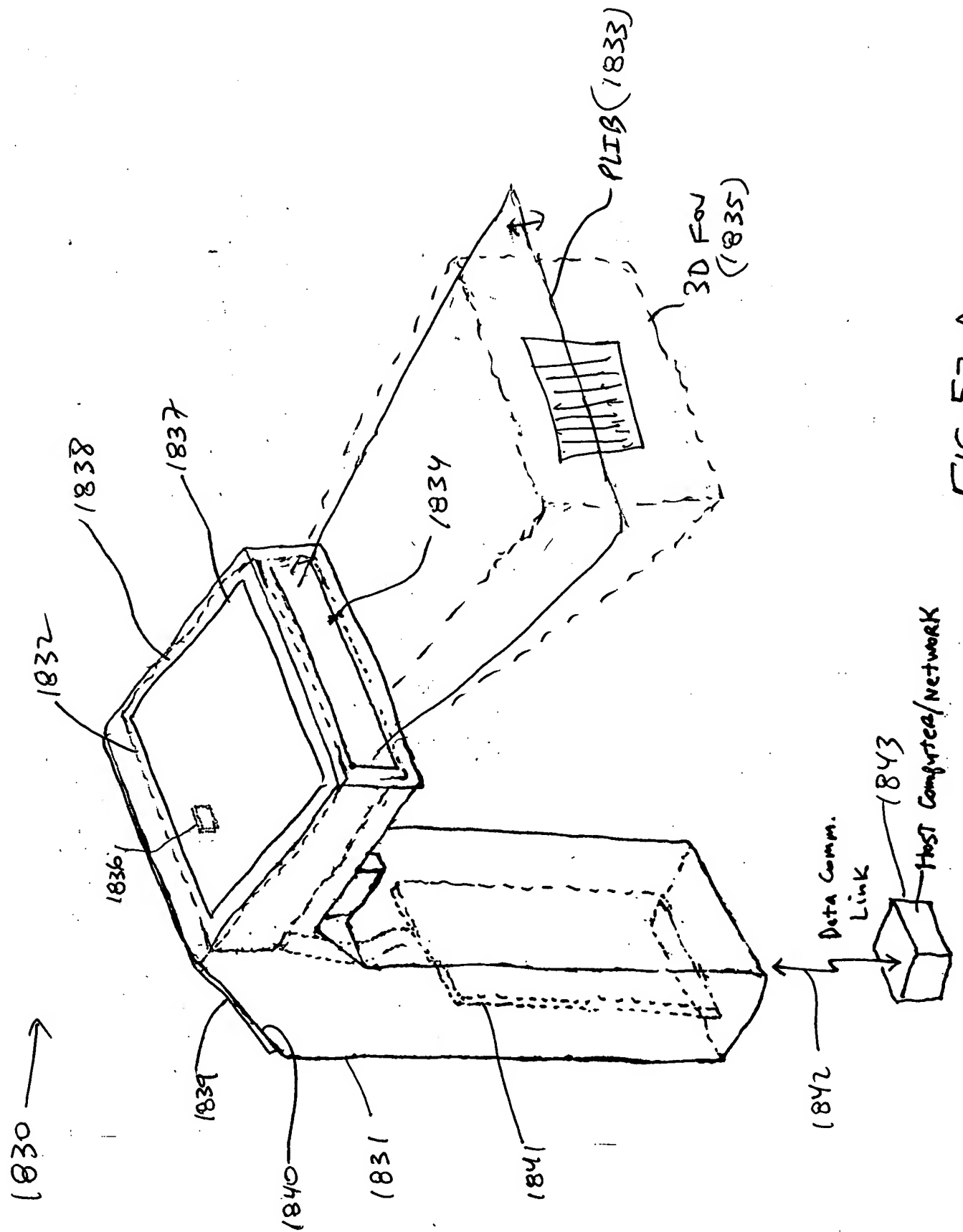


FIG. 52A

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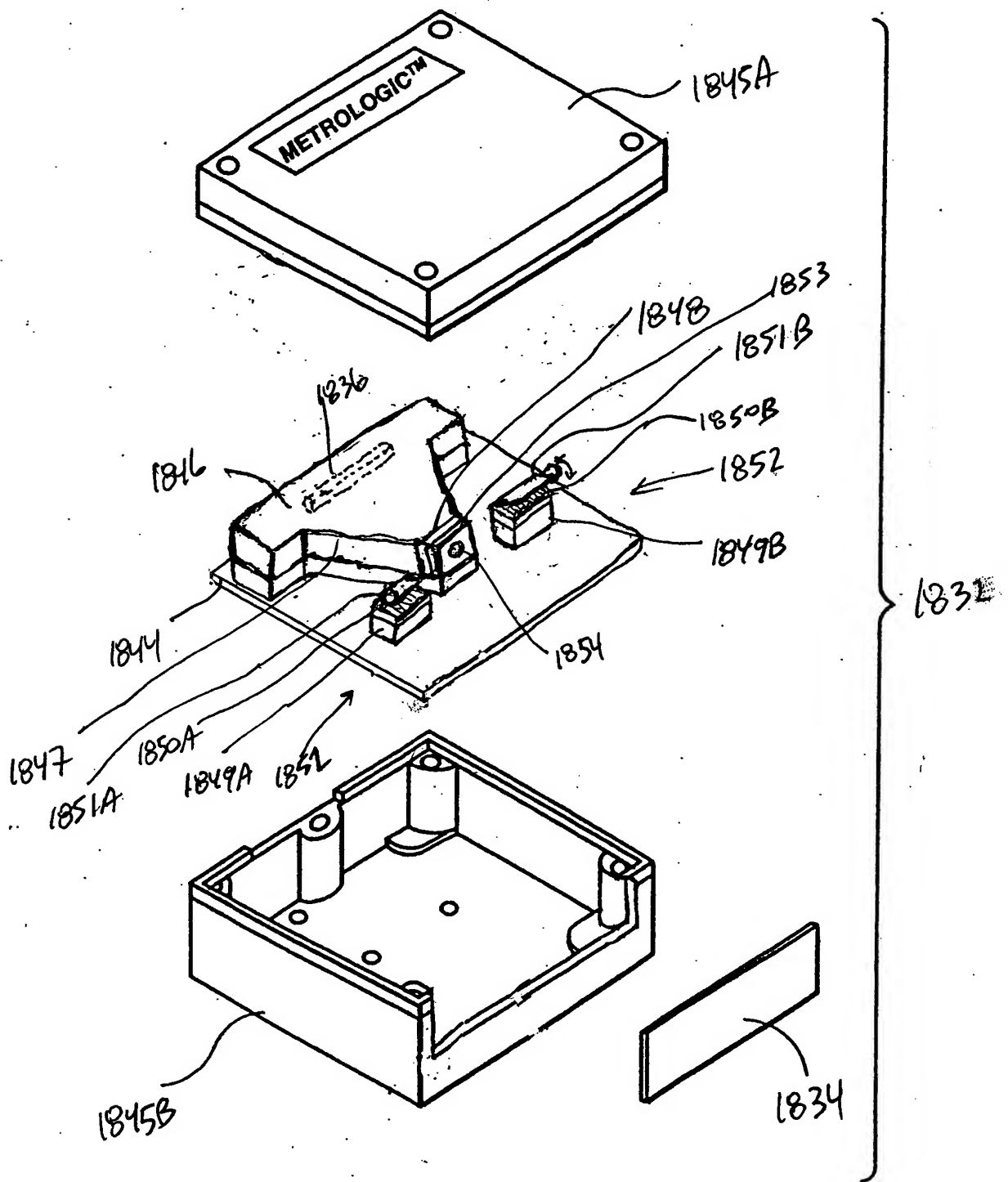


FIG. 52B

Fig. 1I3A-3B

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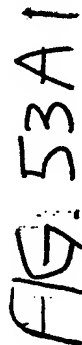


FIG. 53A1

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[illegible]

1880

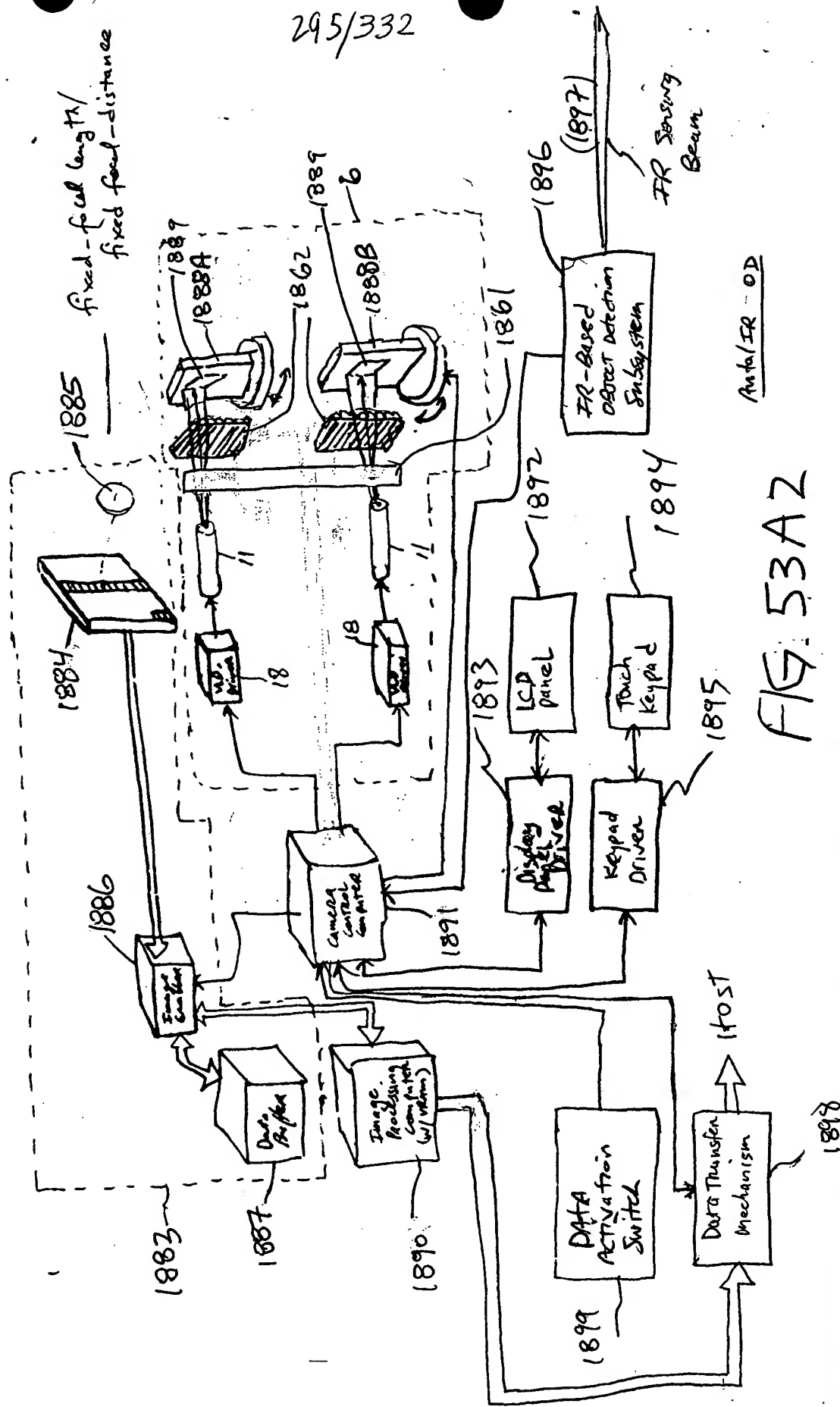


FIG. 53A2

2000

2000

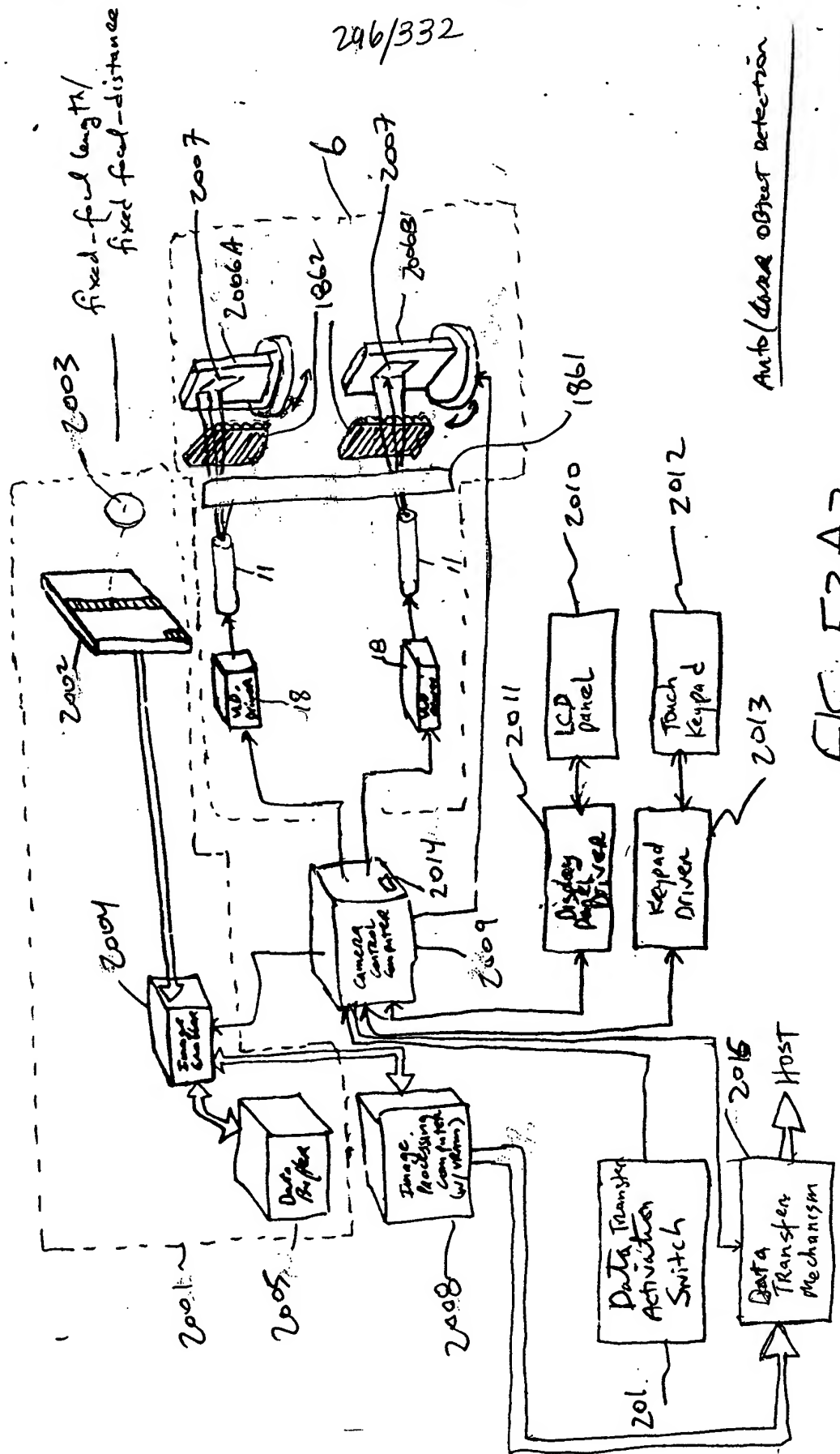
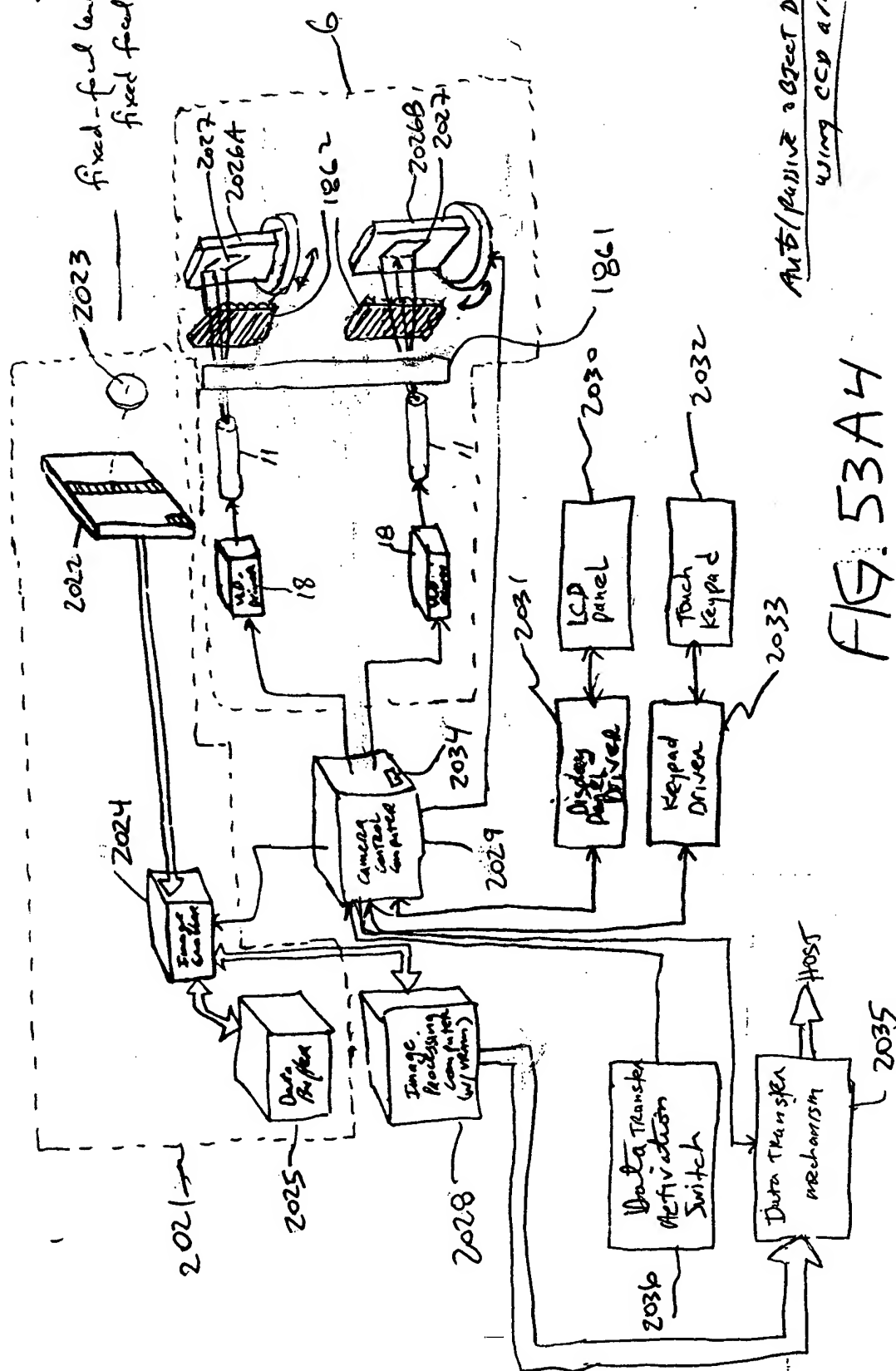


FIG. 53A3

2020

fixed-focal length /
fixed focal-distance

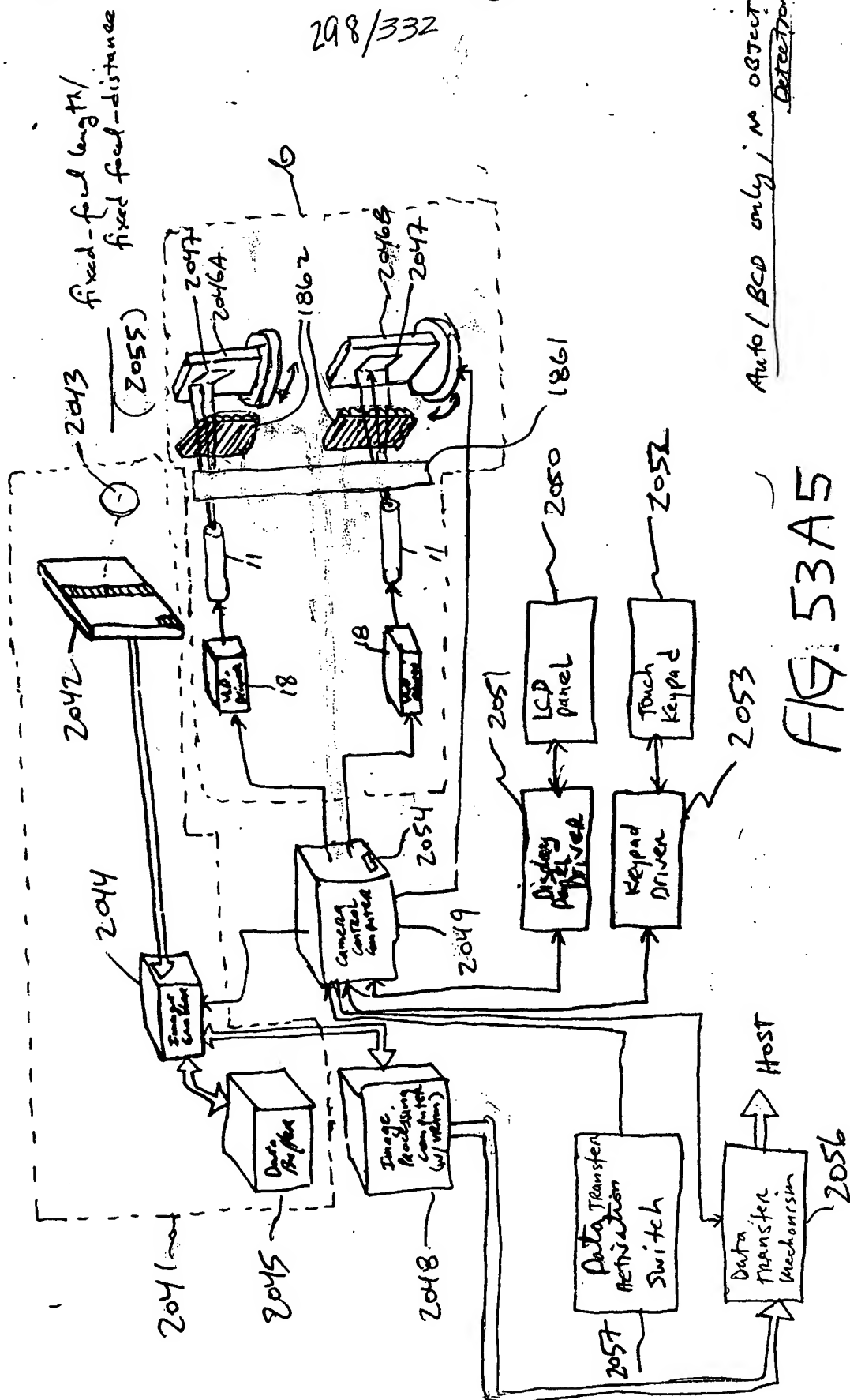
FIG. 53A4



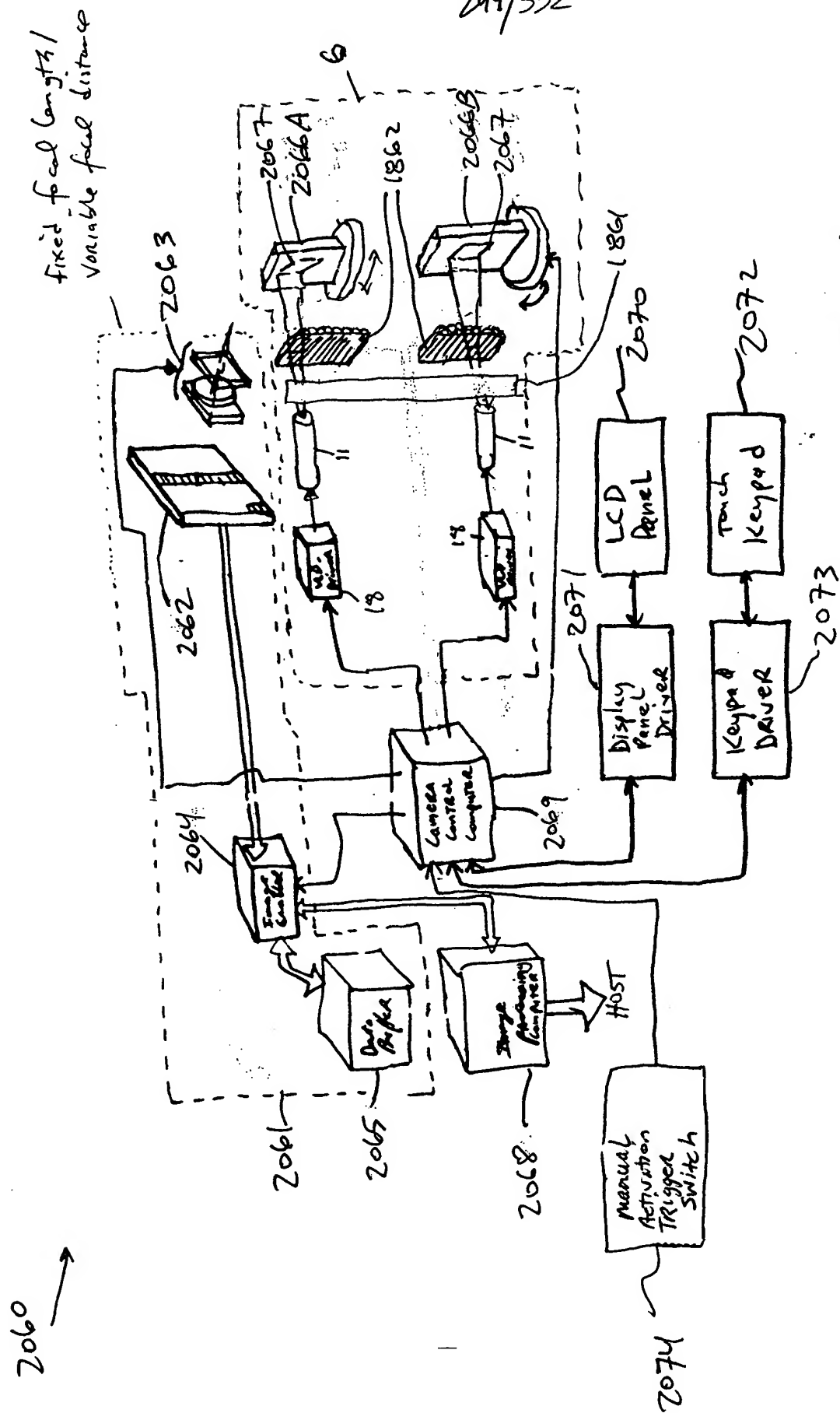
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Auto / BCD only ; no object

FIG. 53A5



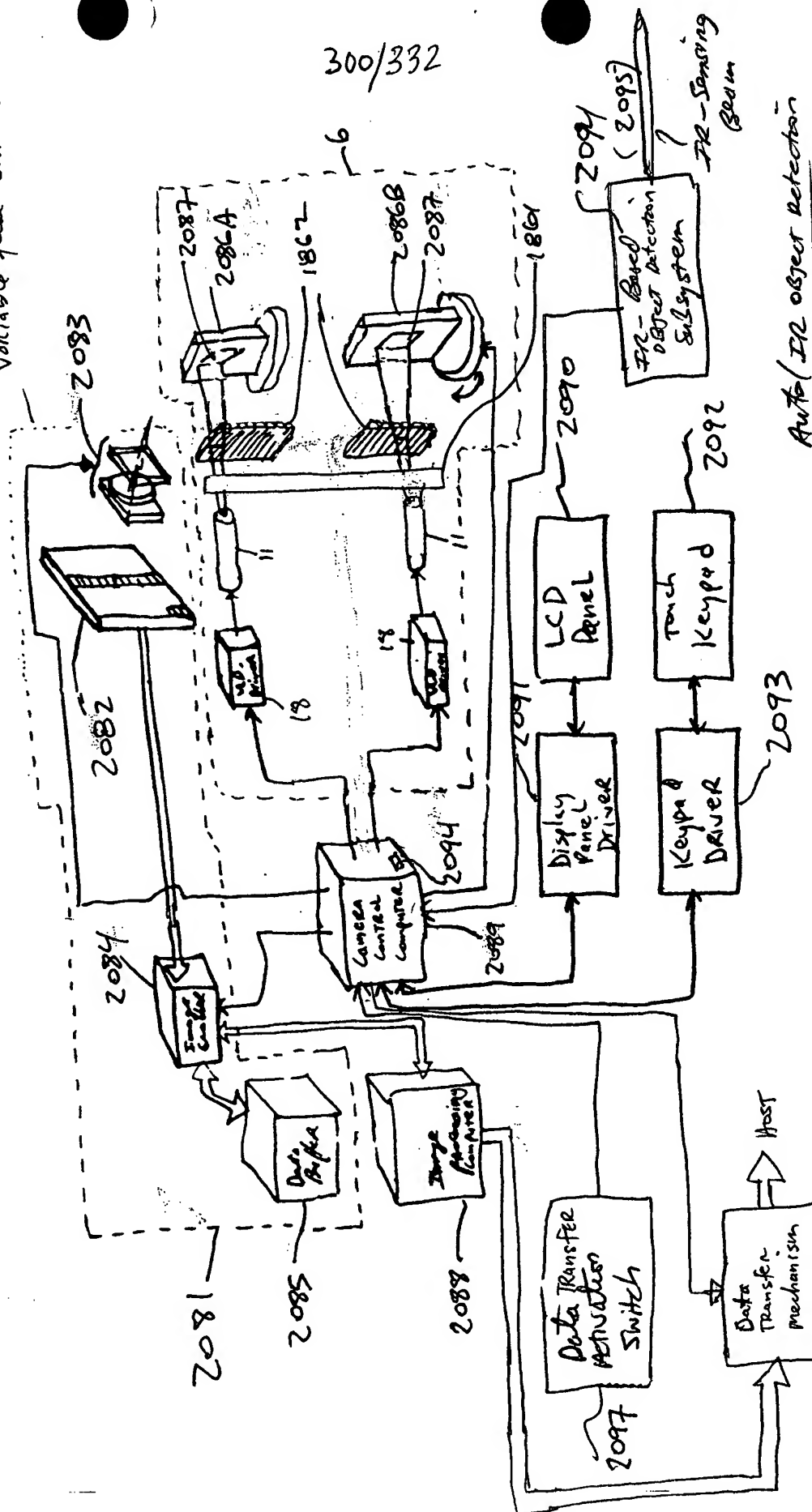
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Manual

2080

fixed focal lengths /
variable focal distances

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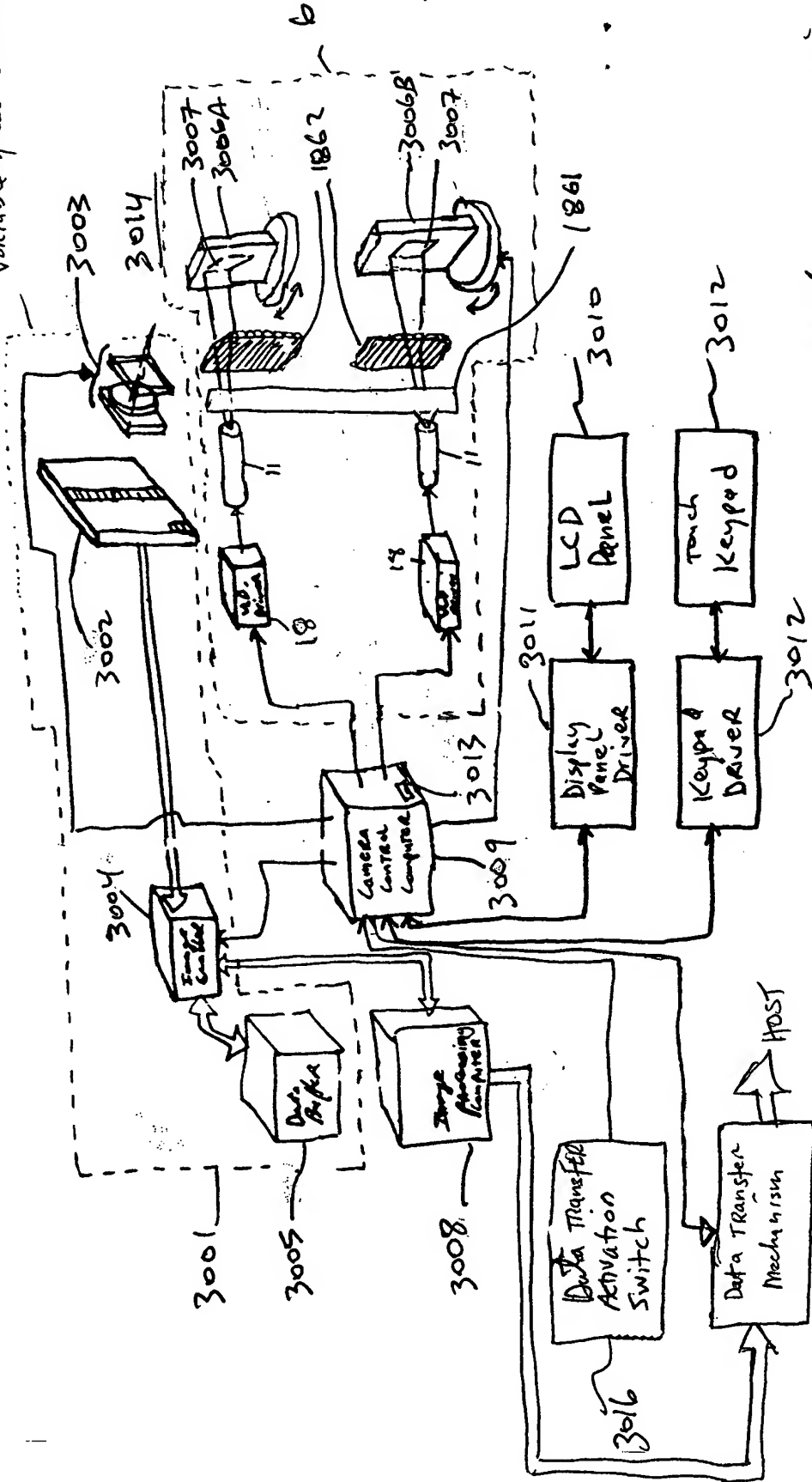
Auto/IR object detection

FIG. 53B2

2096

3000

fixed focal length/
variable focal distance



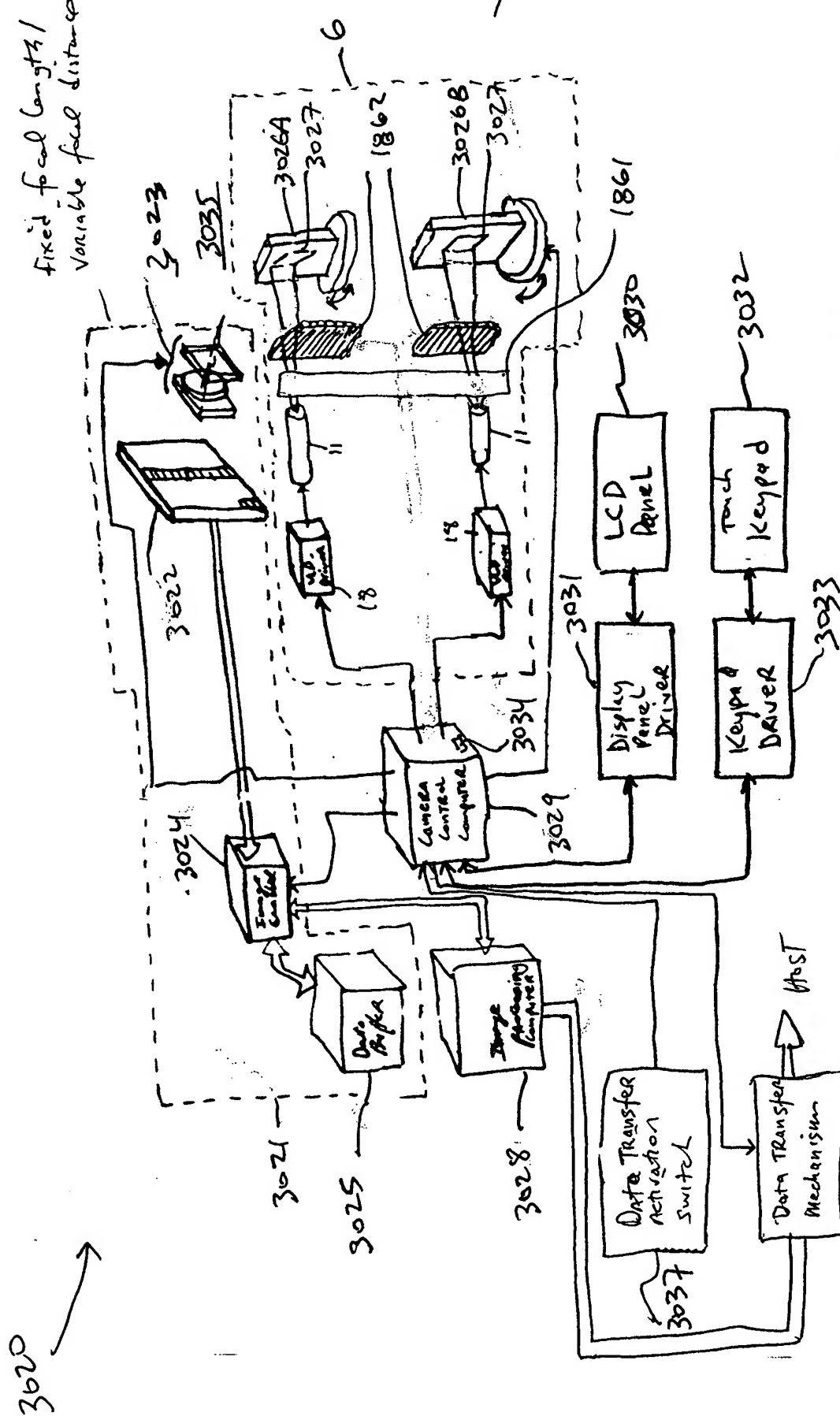
Auto/Zoom object detection

FIG. 53B3

3015

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fixed focal lengths /
variable focal distances



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3040 →

fixed focal length/
variable focal distance

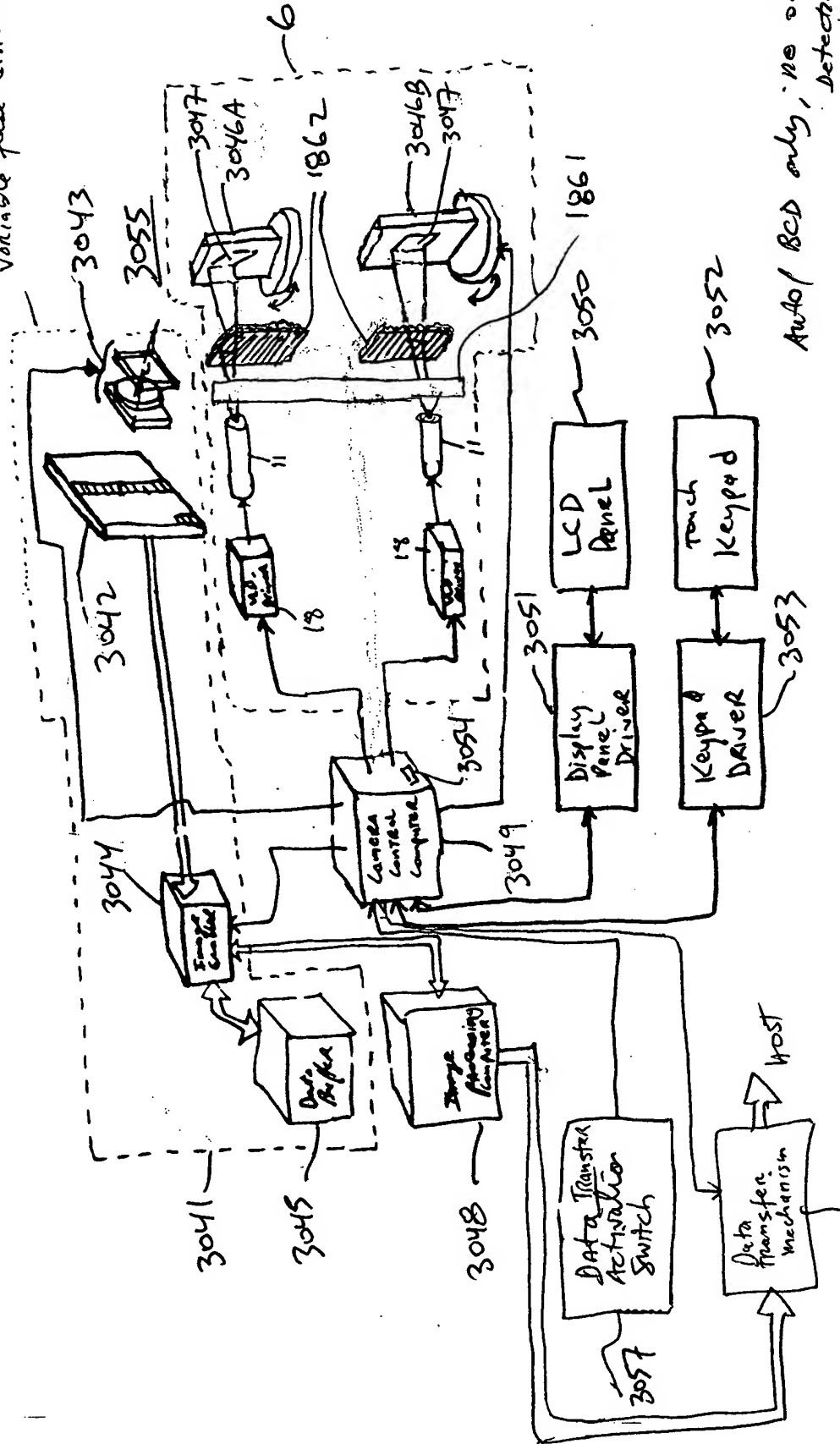


FIG. 53B5

Auto/ BCD only, no object
detection

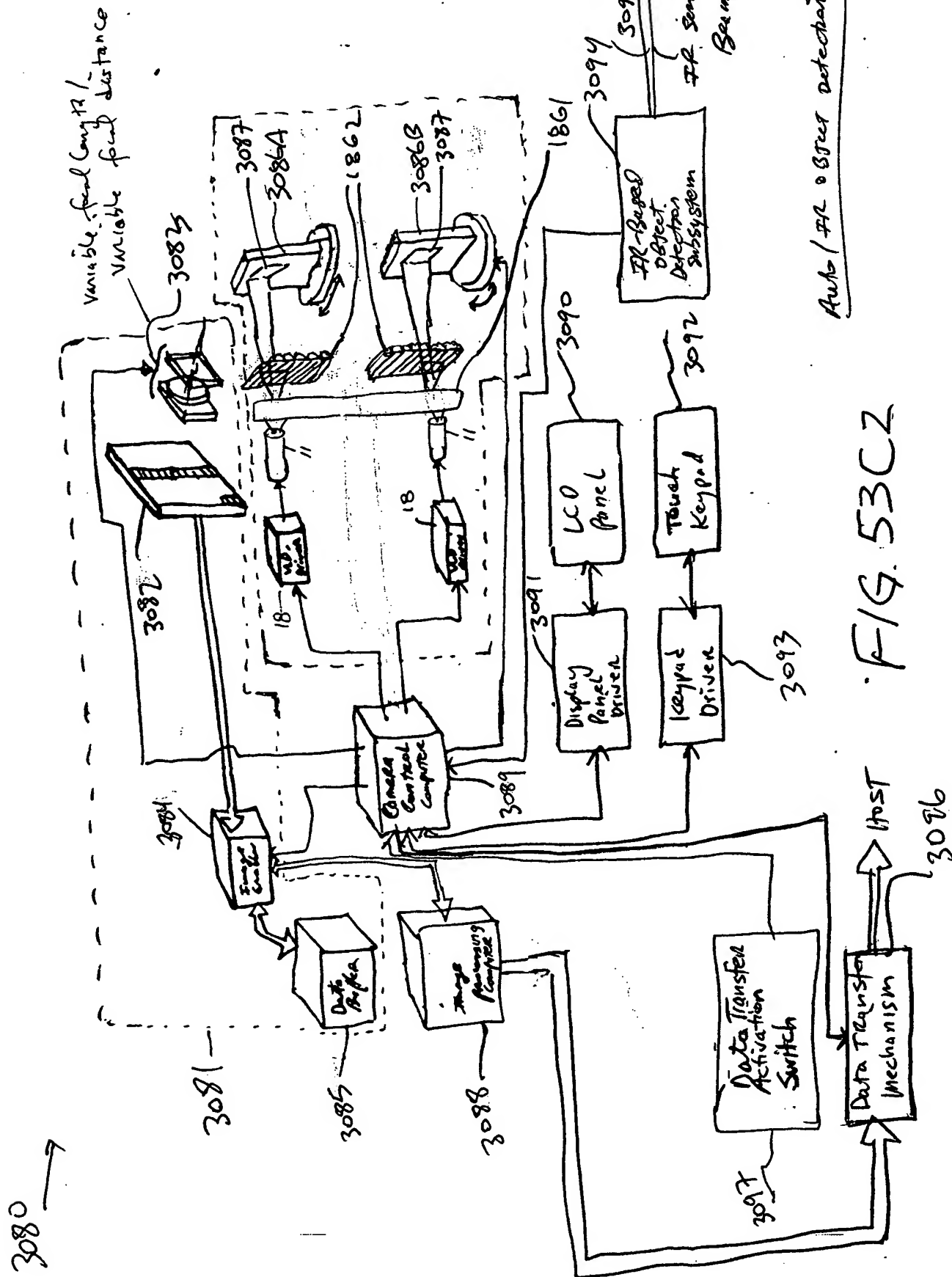
$$305/33\bar{2}$$


FIG. 53C2

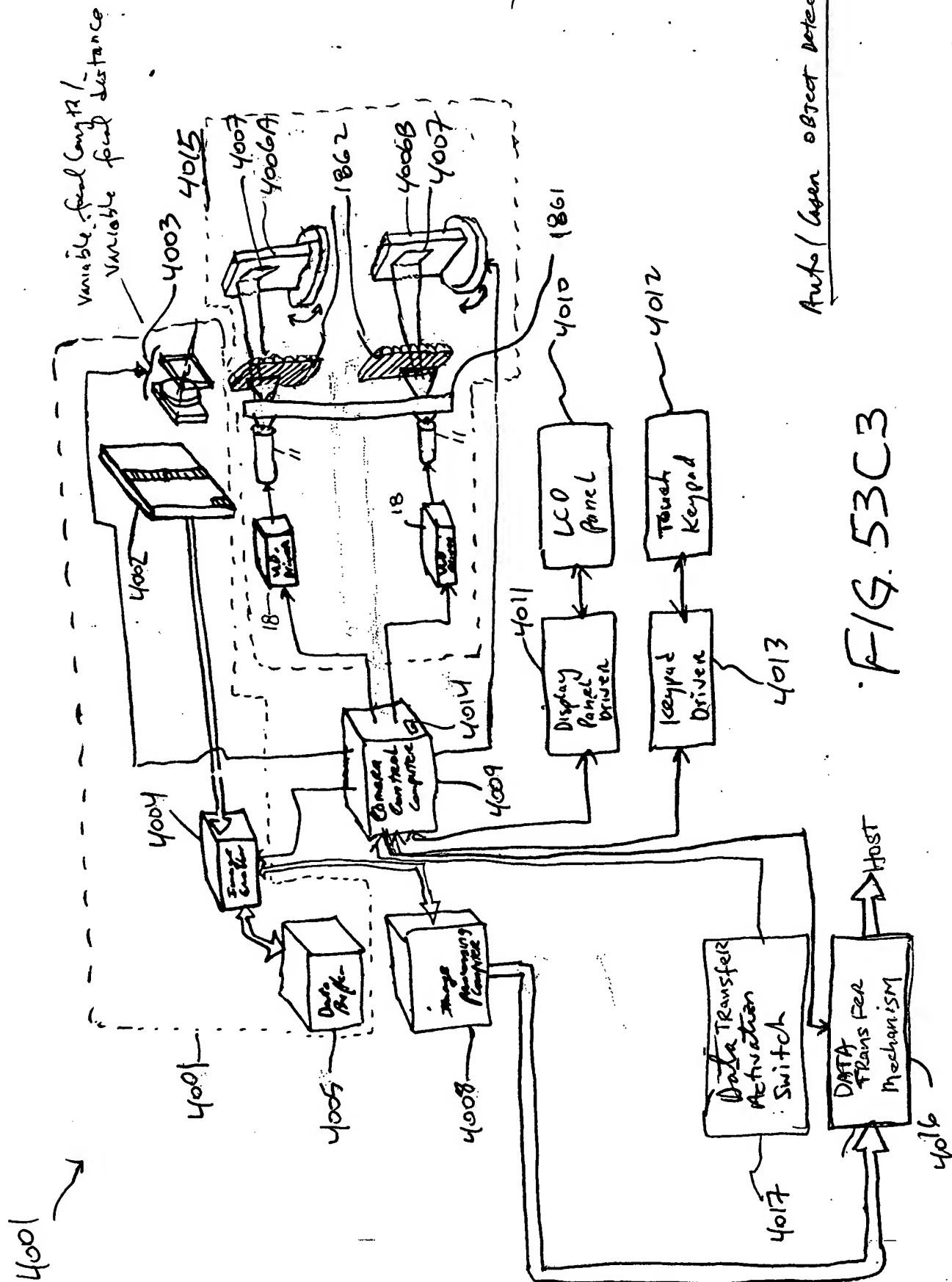
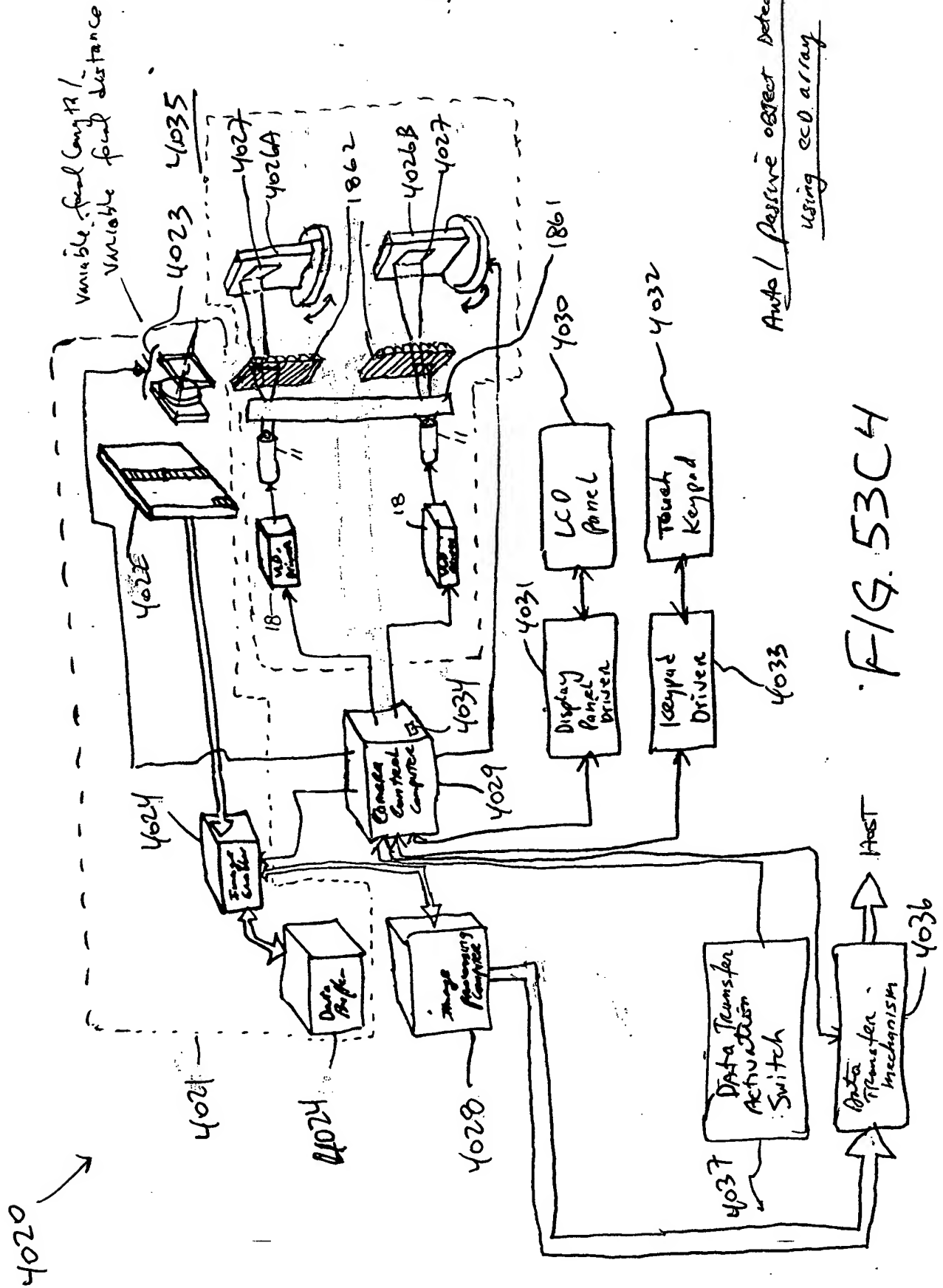
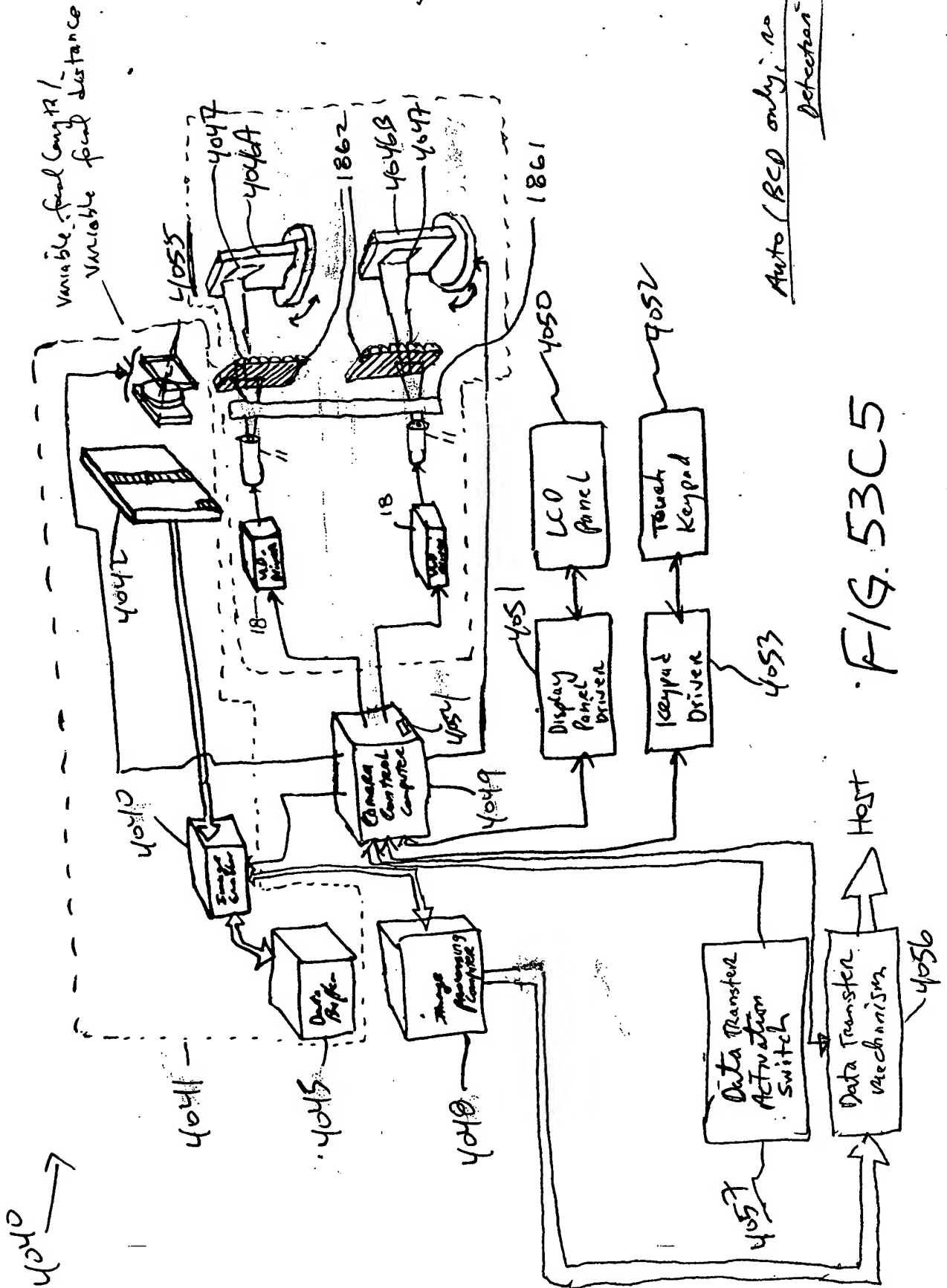
Auto / User Object Detection ¹ =

FIG. 53C3



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Auto (BCD only) no object detection

FIG. 53C5

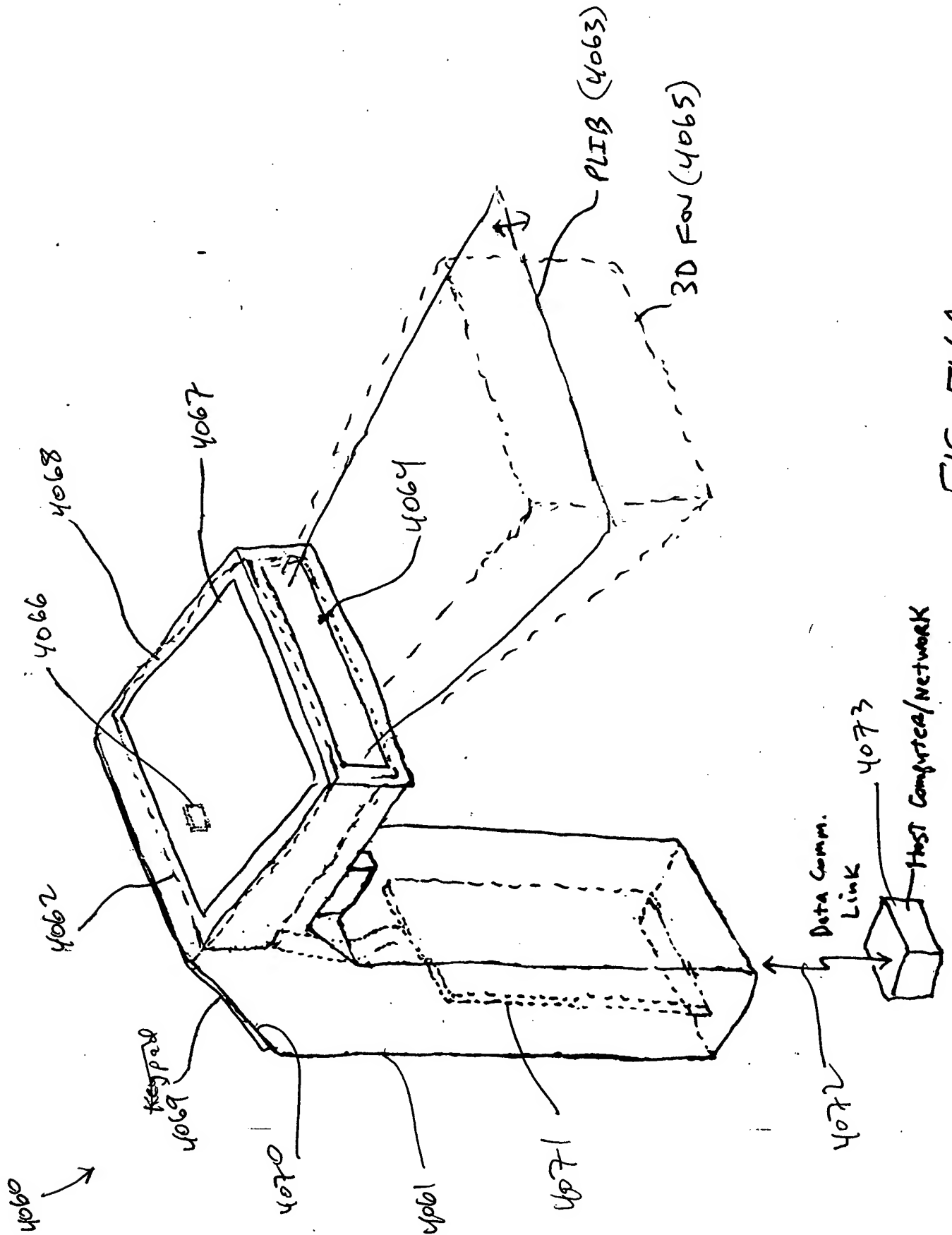


FIG. 54A

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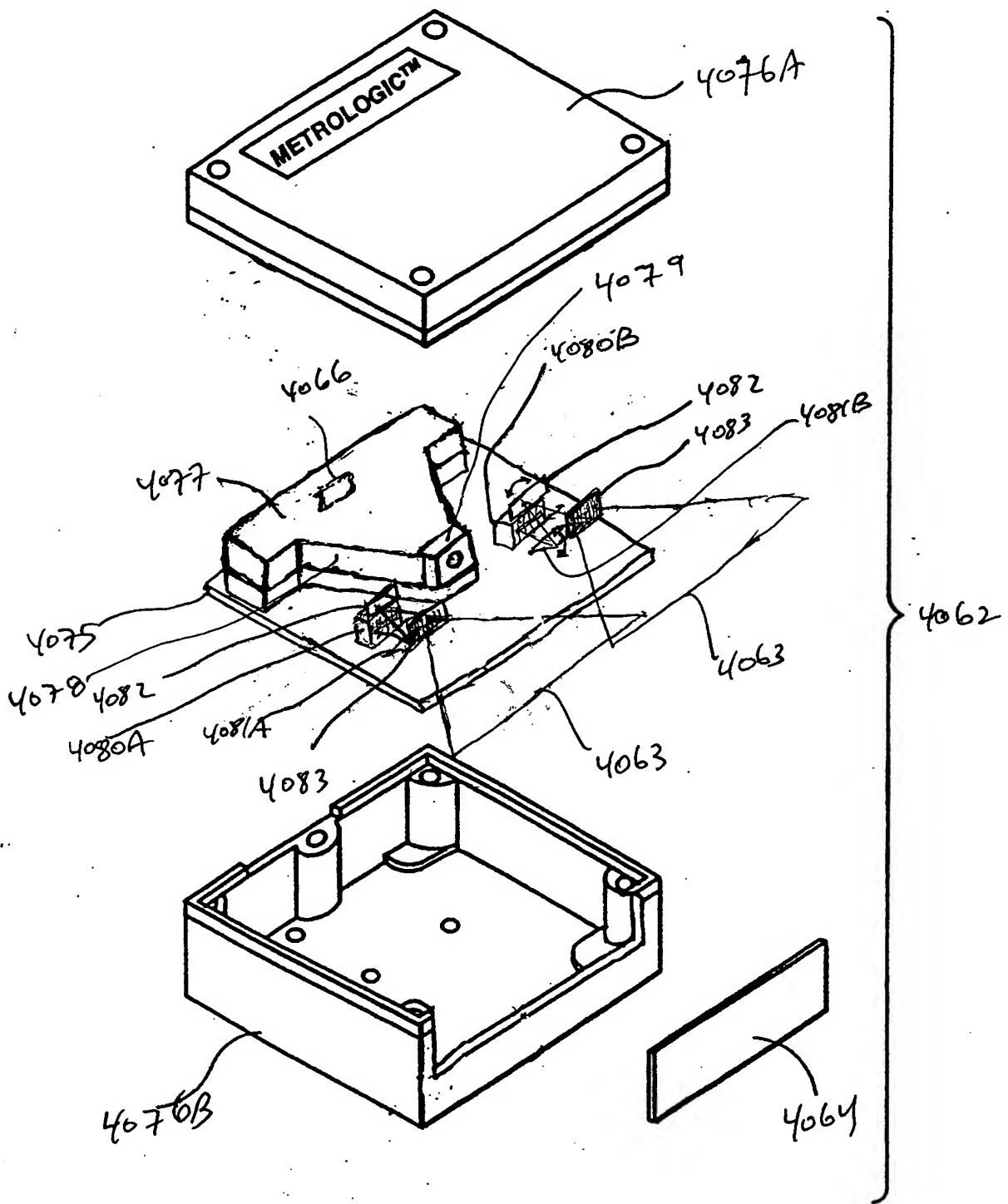
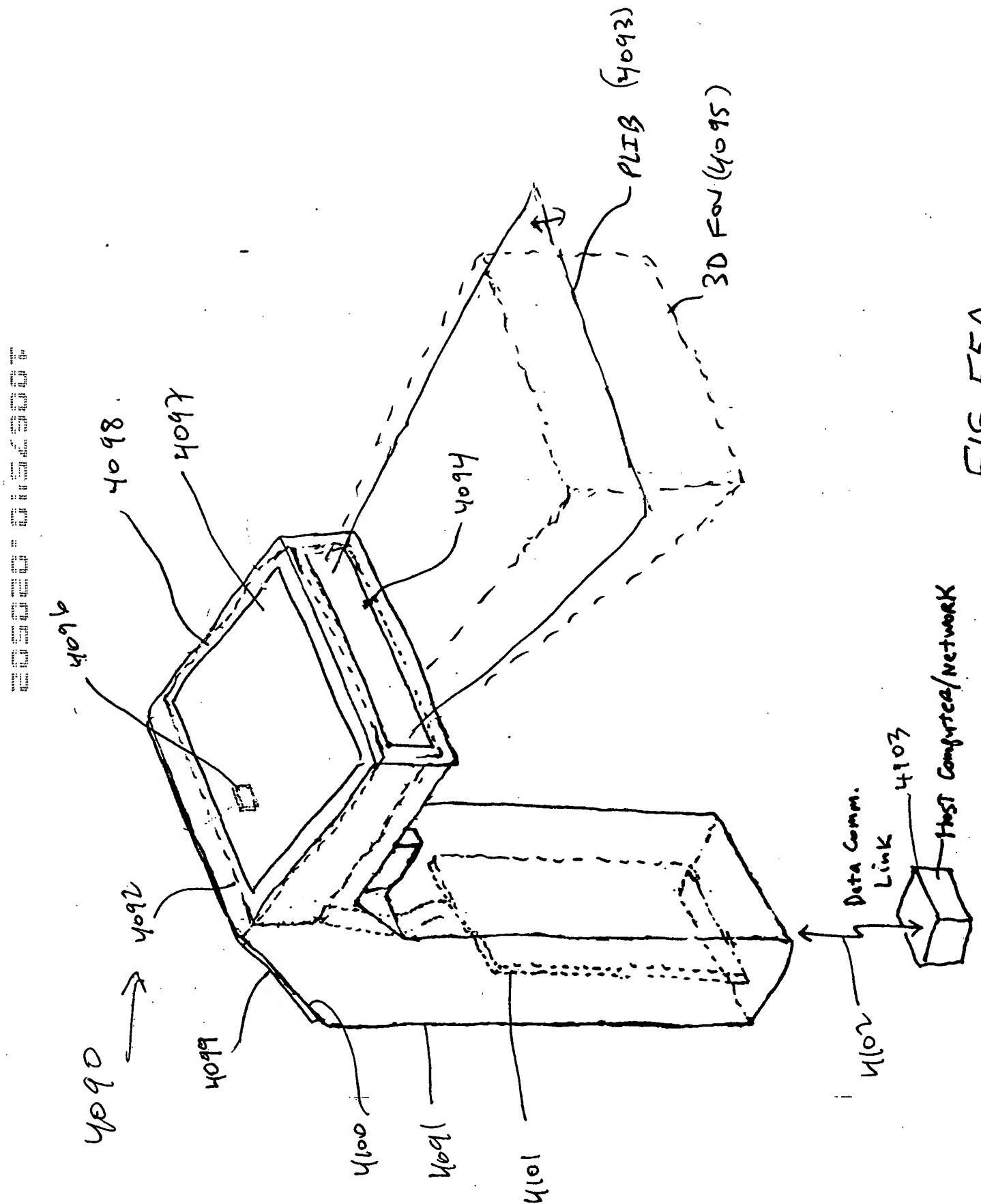


FIG. 54B

(dual mirrors)

Fig. 175A-SP1



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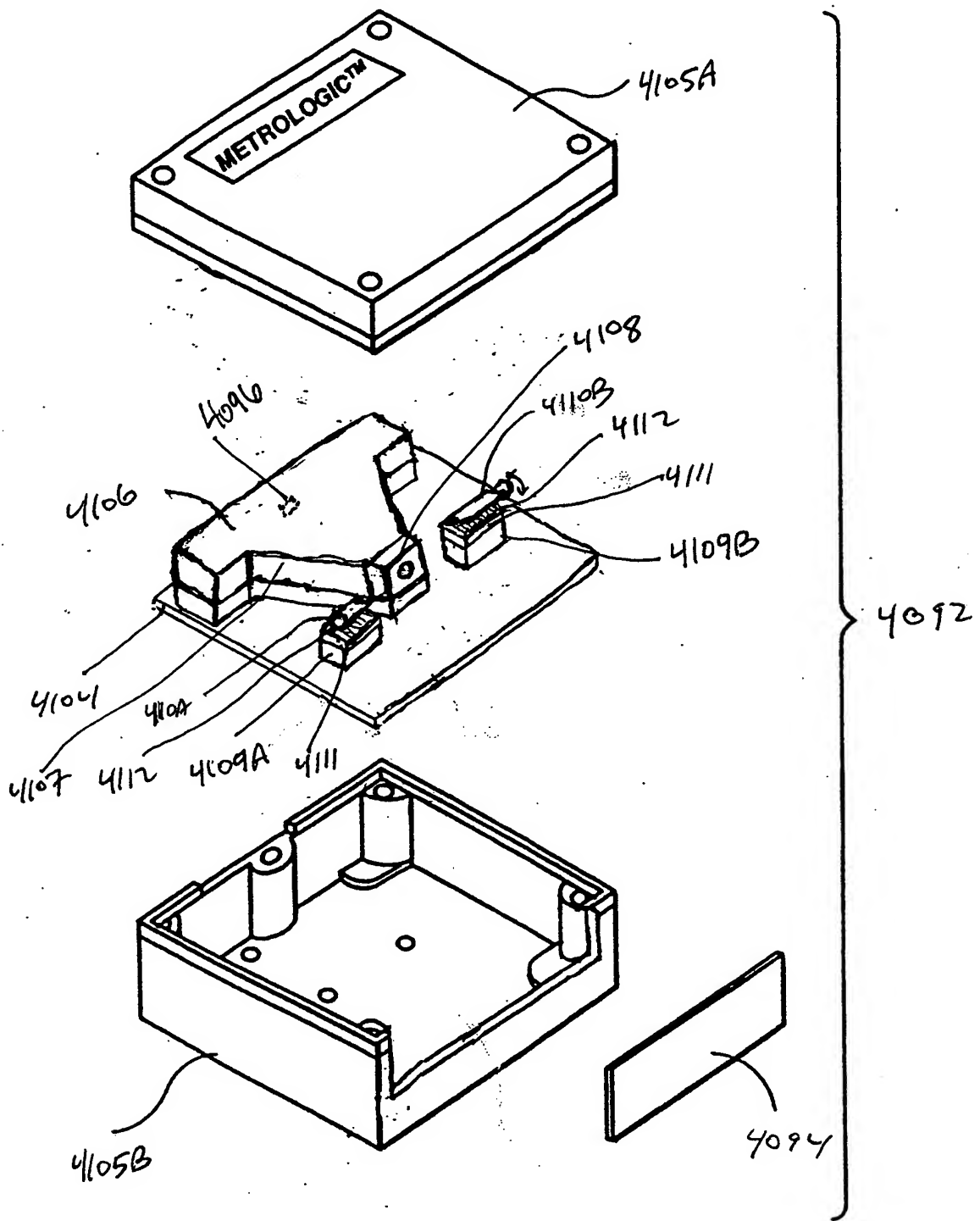


FIG. 55B

Brogg cell
Fig. 116A-6B

40067519.000000

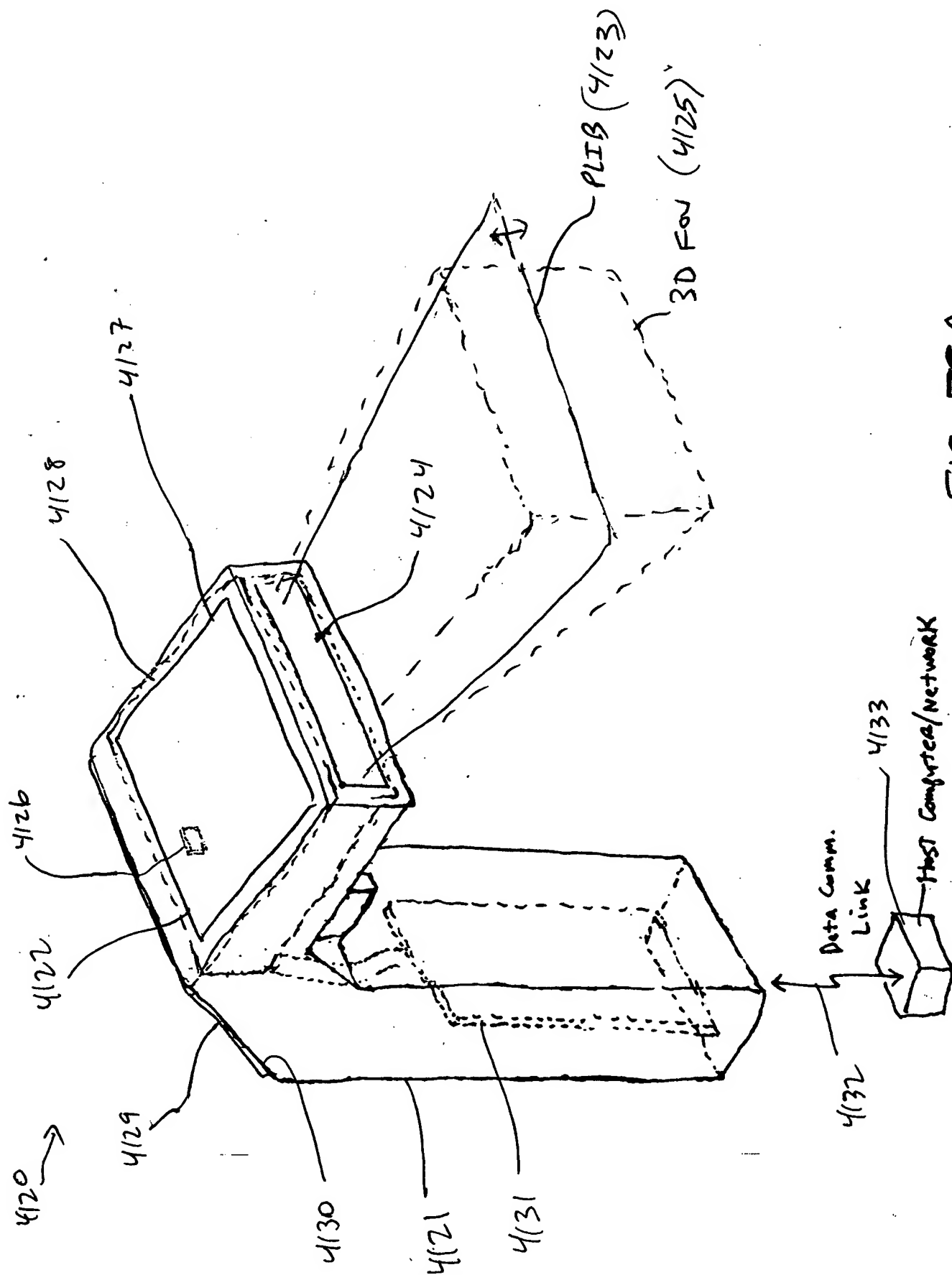


FIG. 56A

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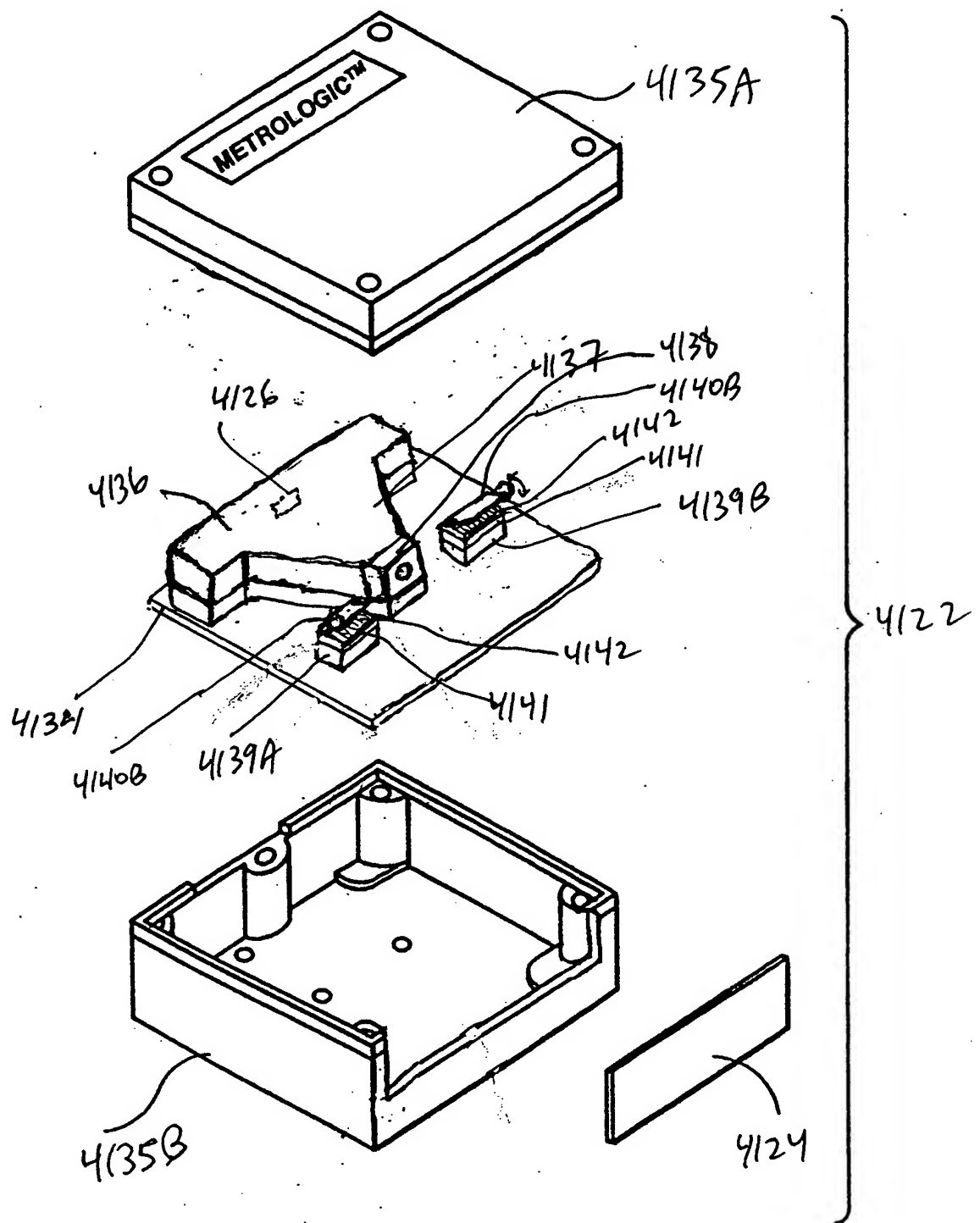


FIG. 56B

DM

Fig. 1I 7A-7C

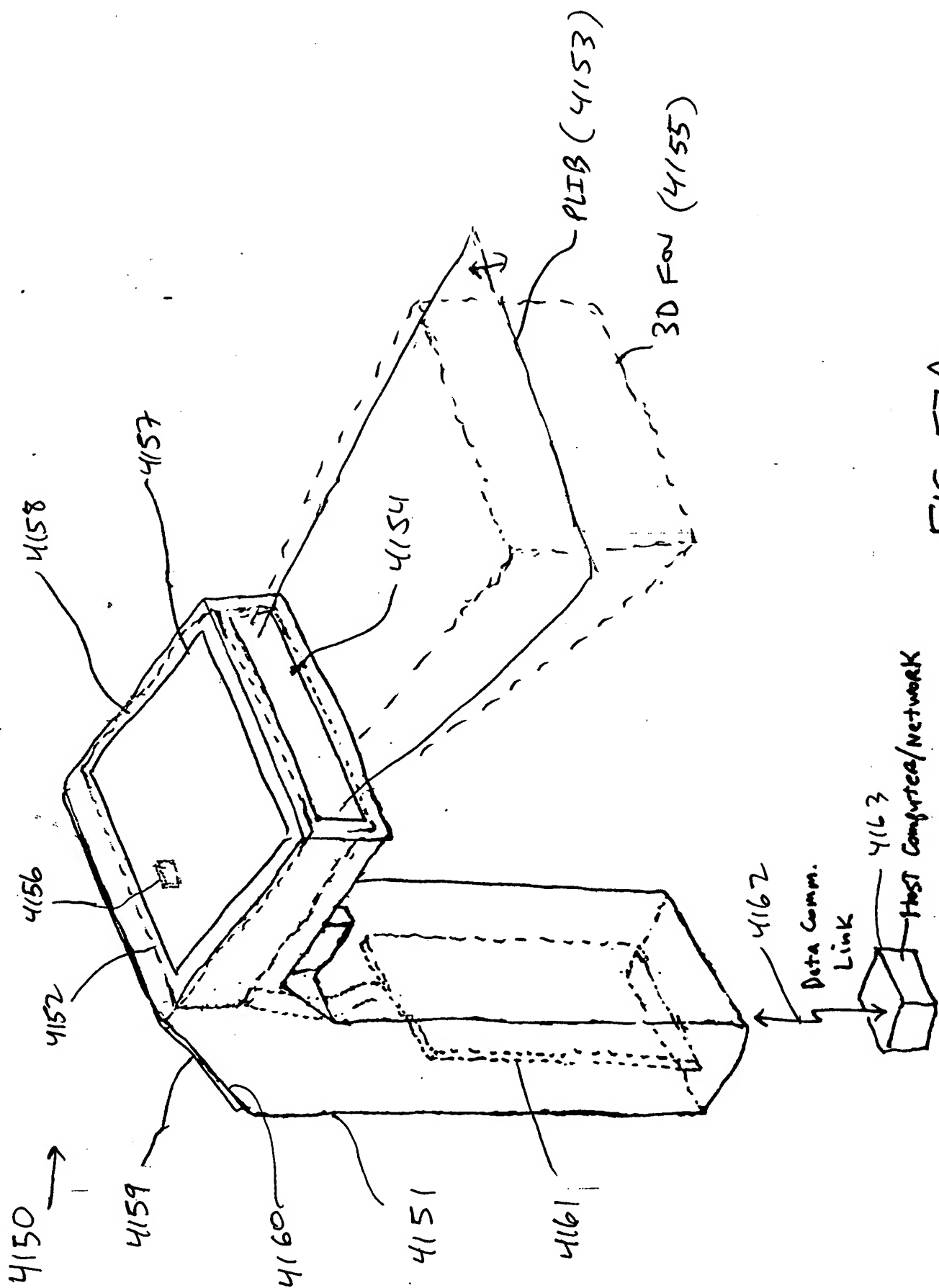


FIG. 57A

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405210-0000

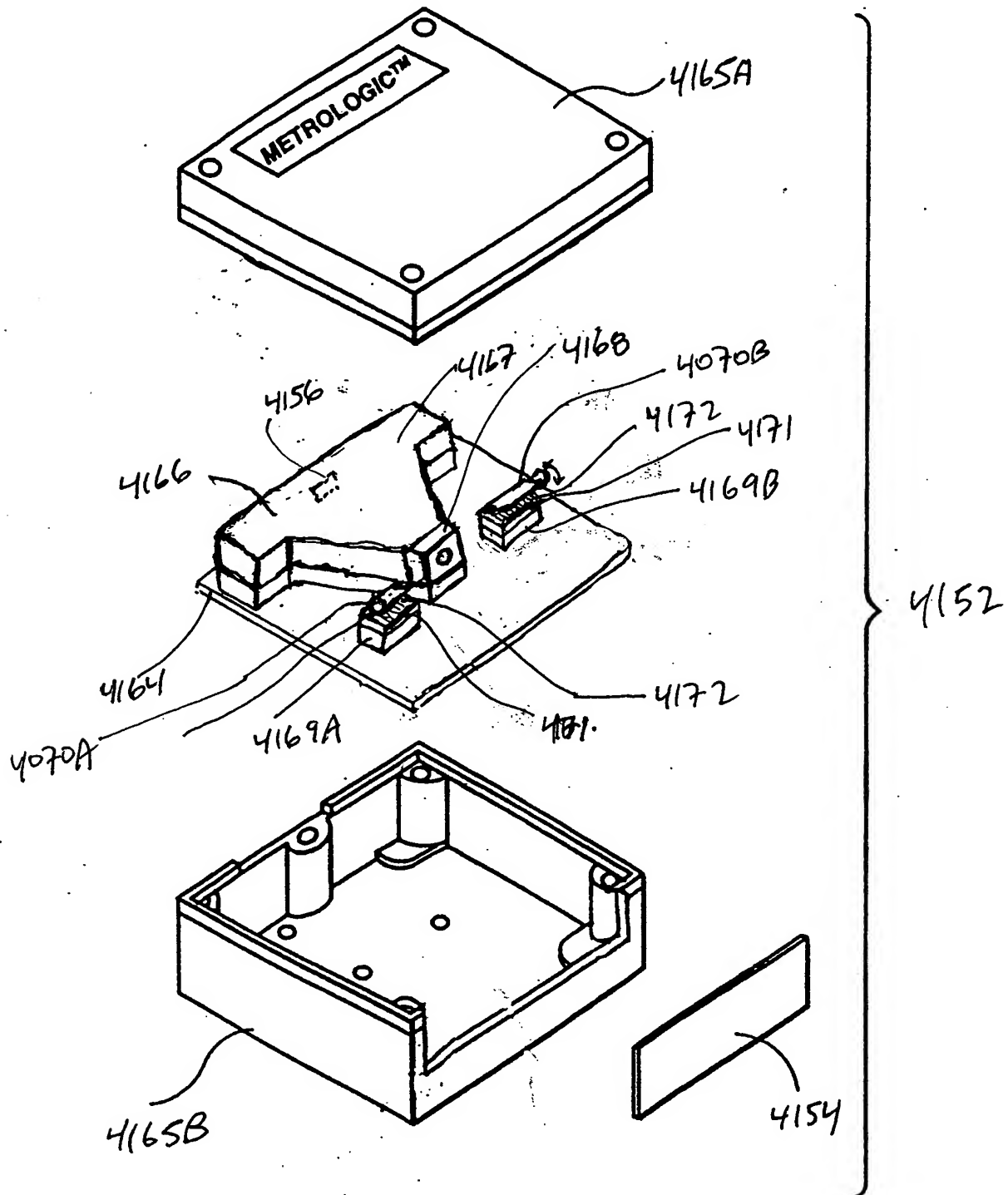


FIG. 57B

please only LCR
on panel

Fys 1F8F-86

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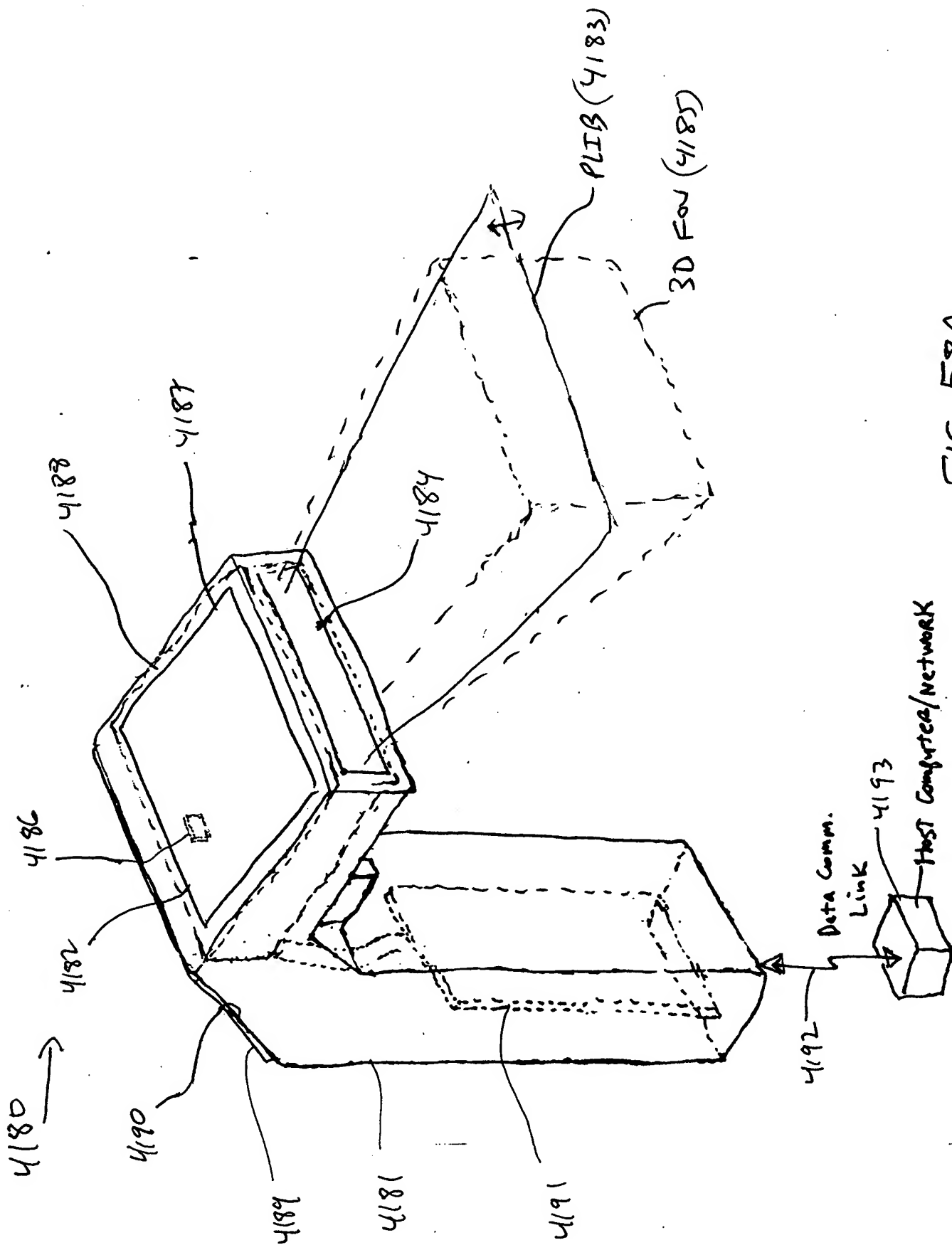


FIG. 58A

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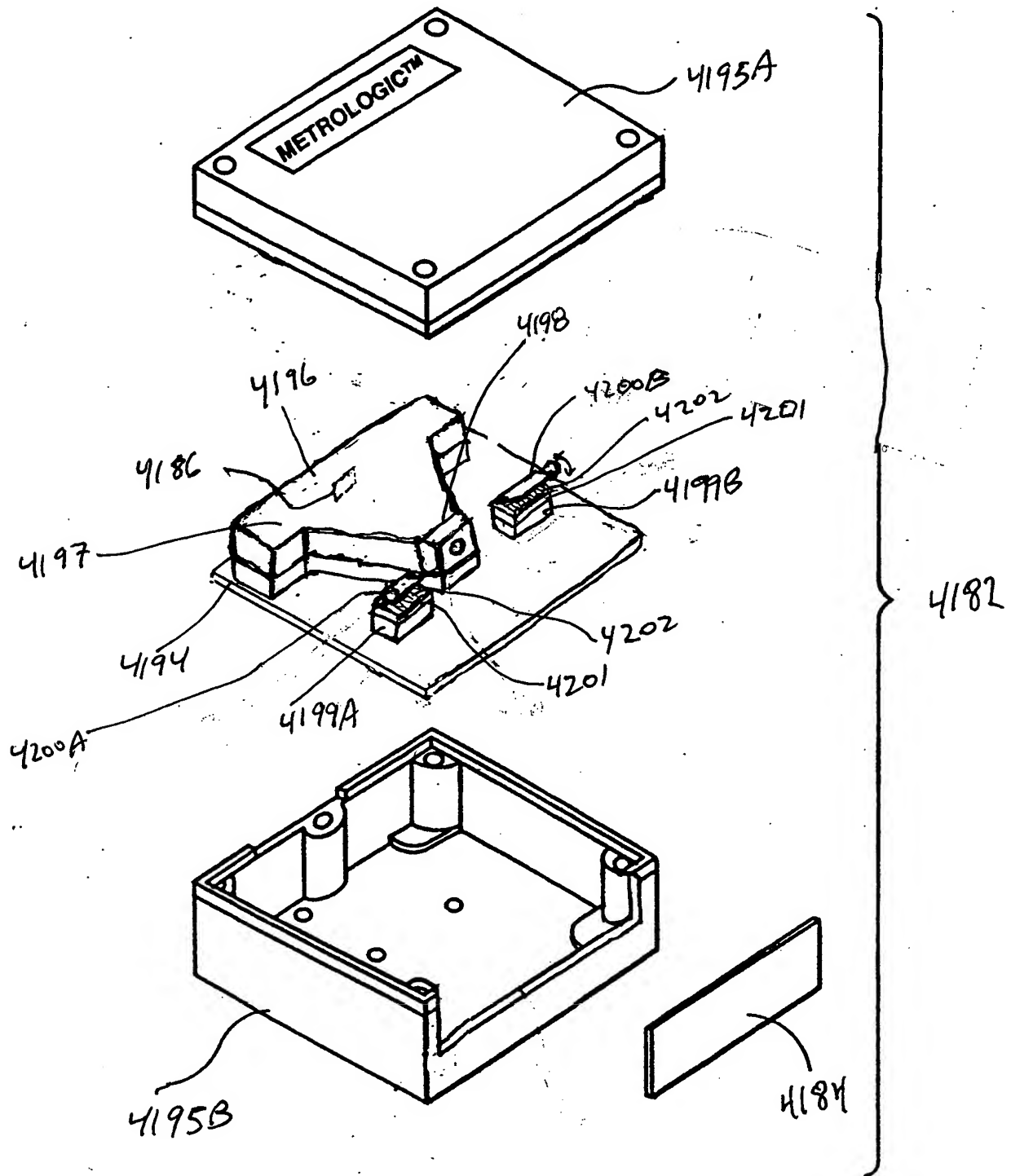


FIG. 58B

HS optical shutter

Fig. 1F14A-14B

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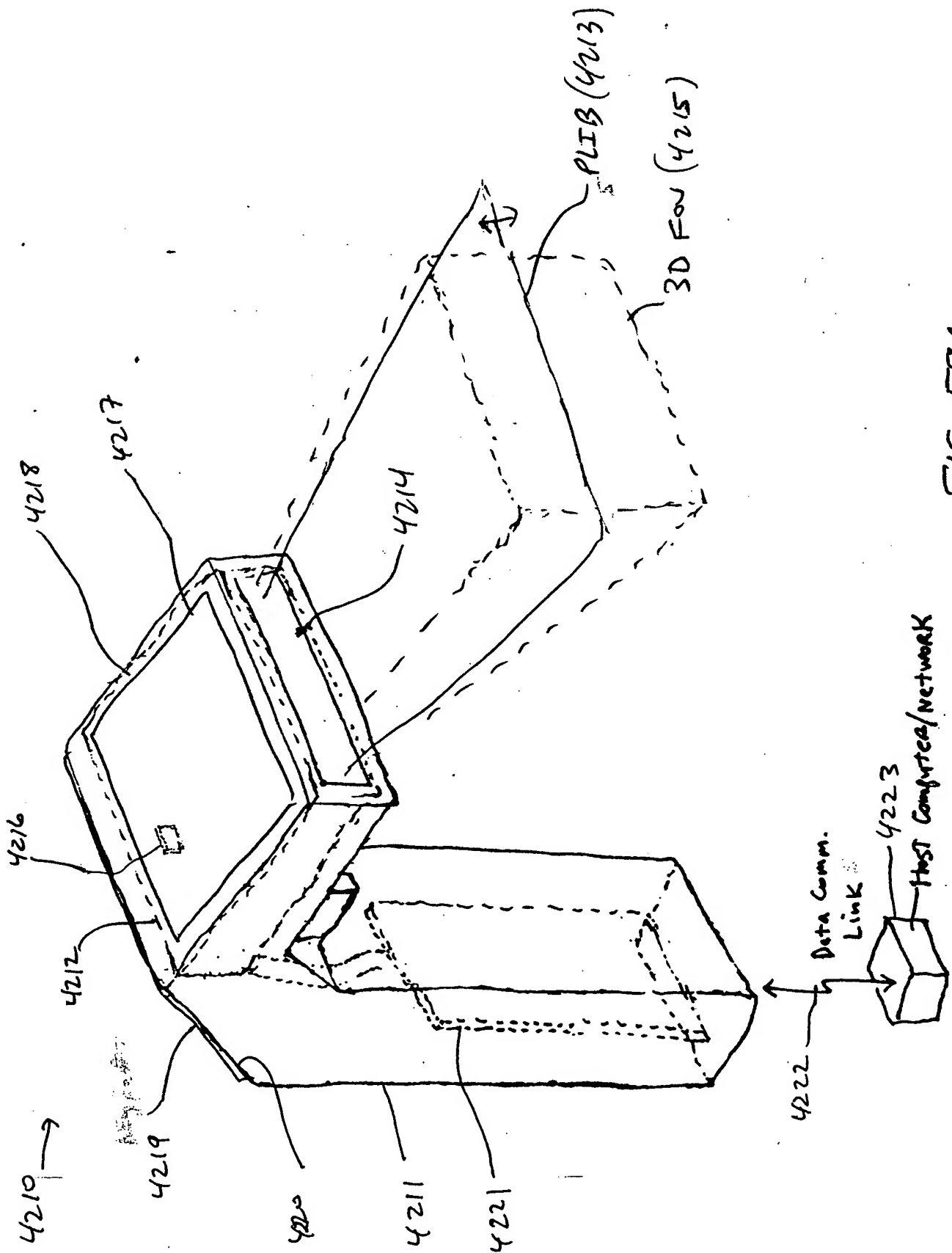
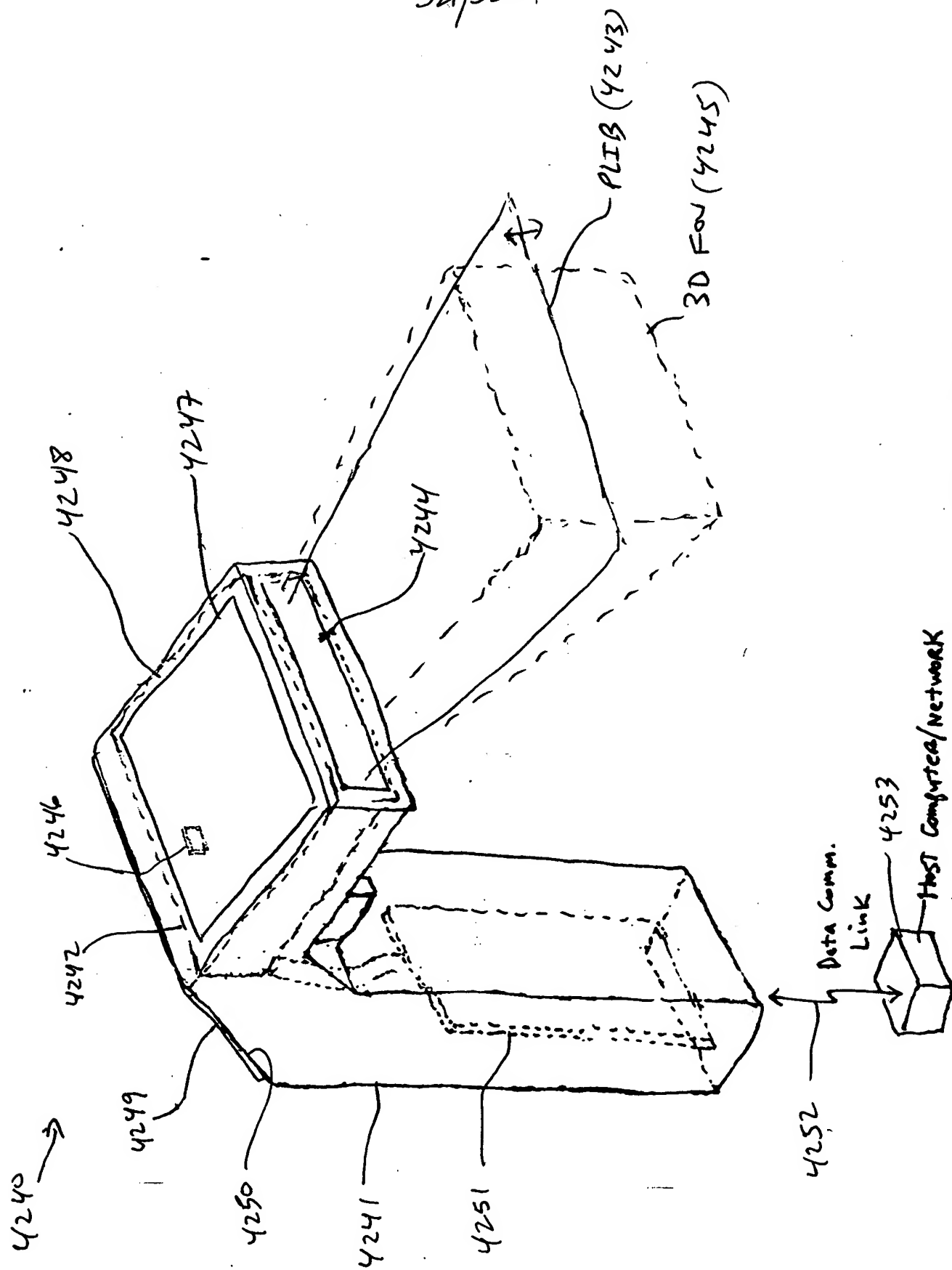


FIG. 59A

[illegible]

MLLP
Fig. 1E15A-15B

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[illegible]

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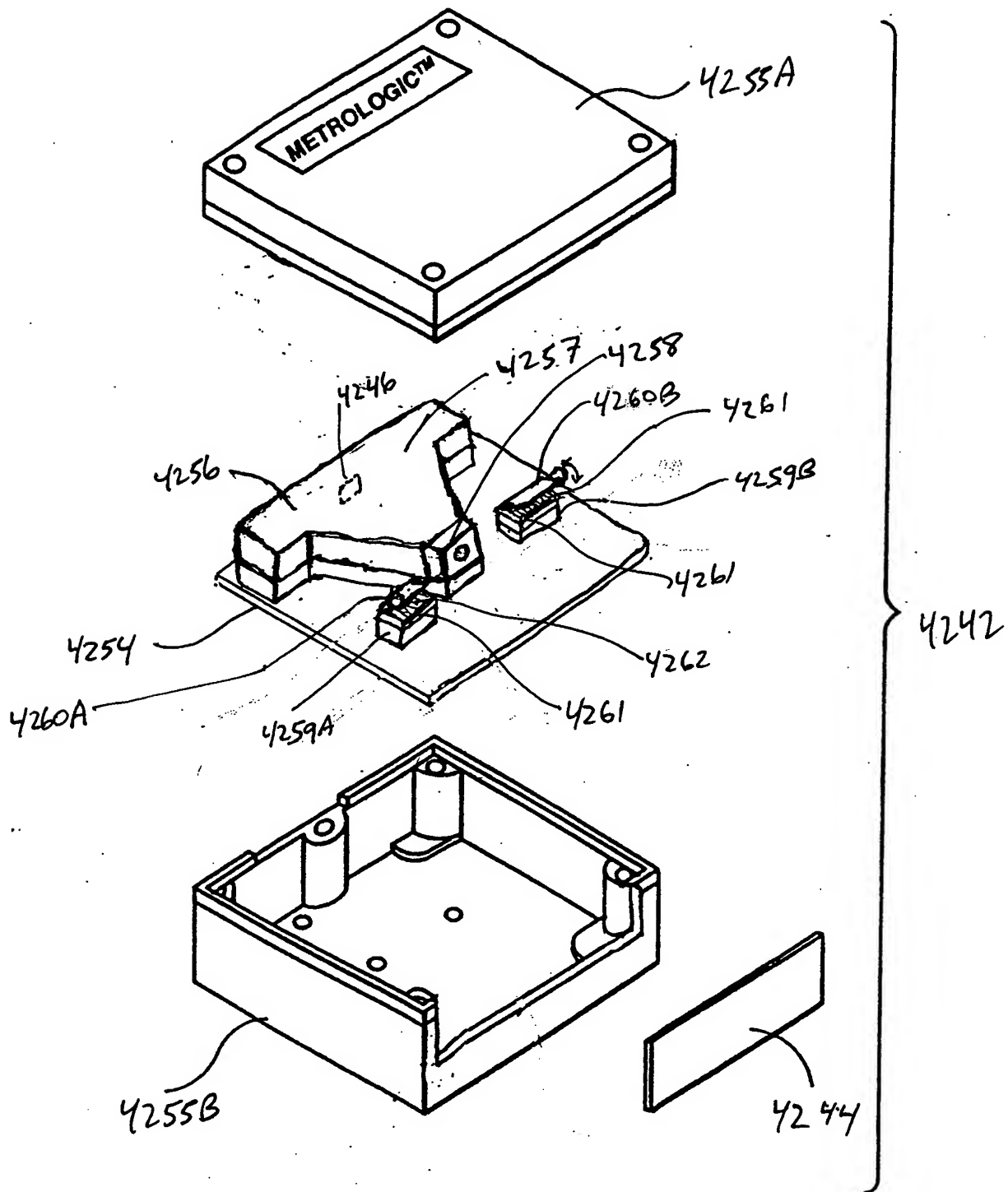


FIG. 60B

Bthalon (Temp. phase mod.)
Fig. 117A-17B

4270

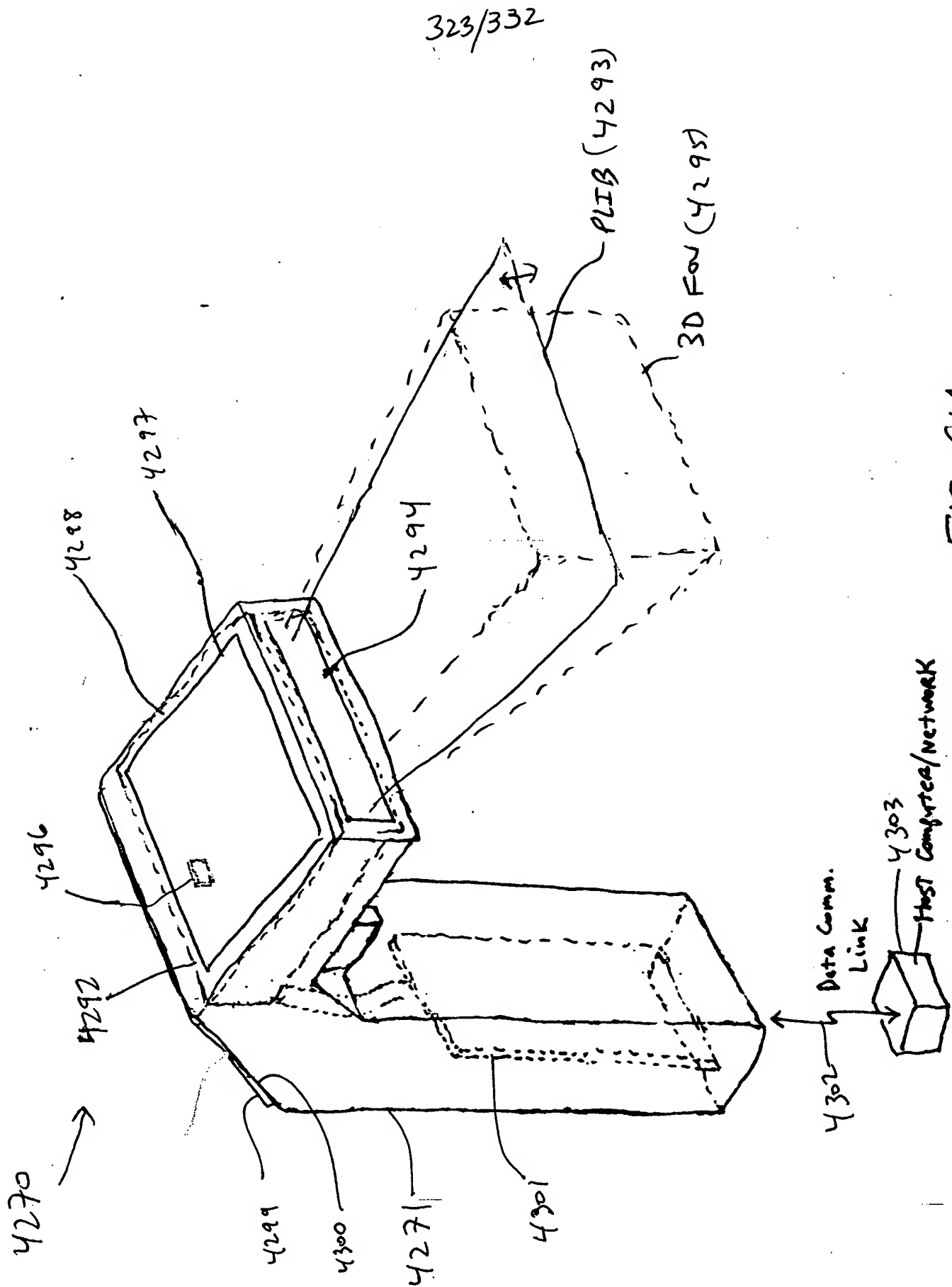


FIG. 61A

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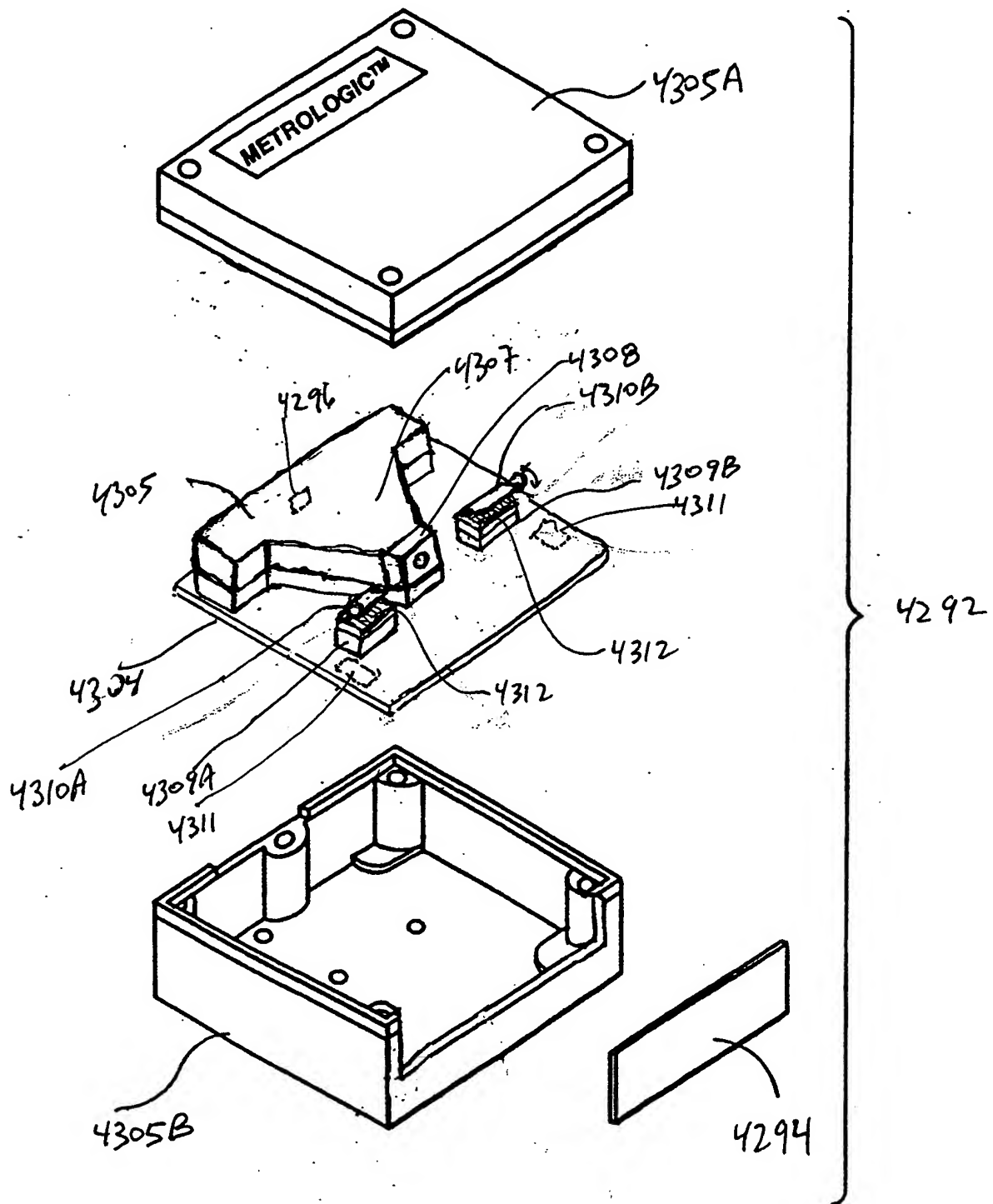
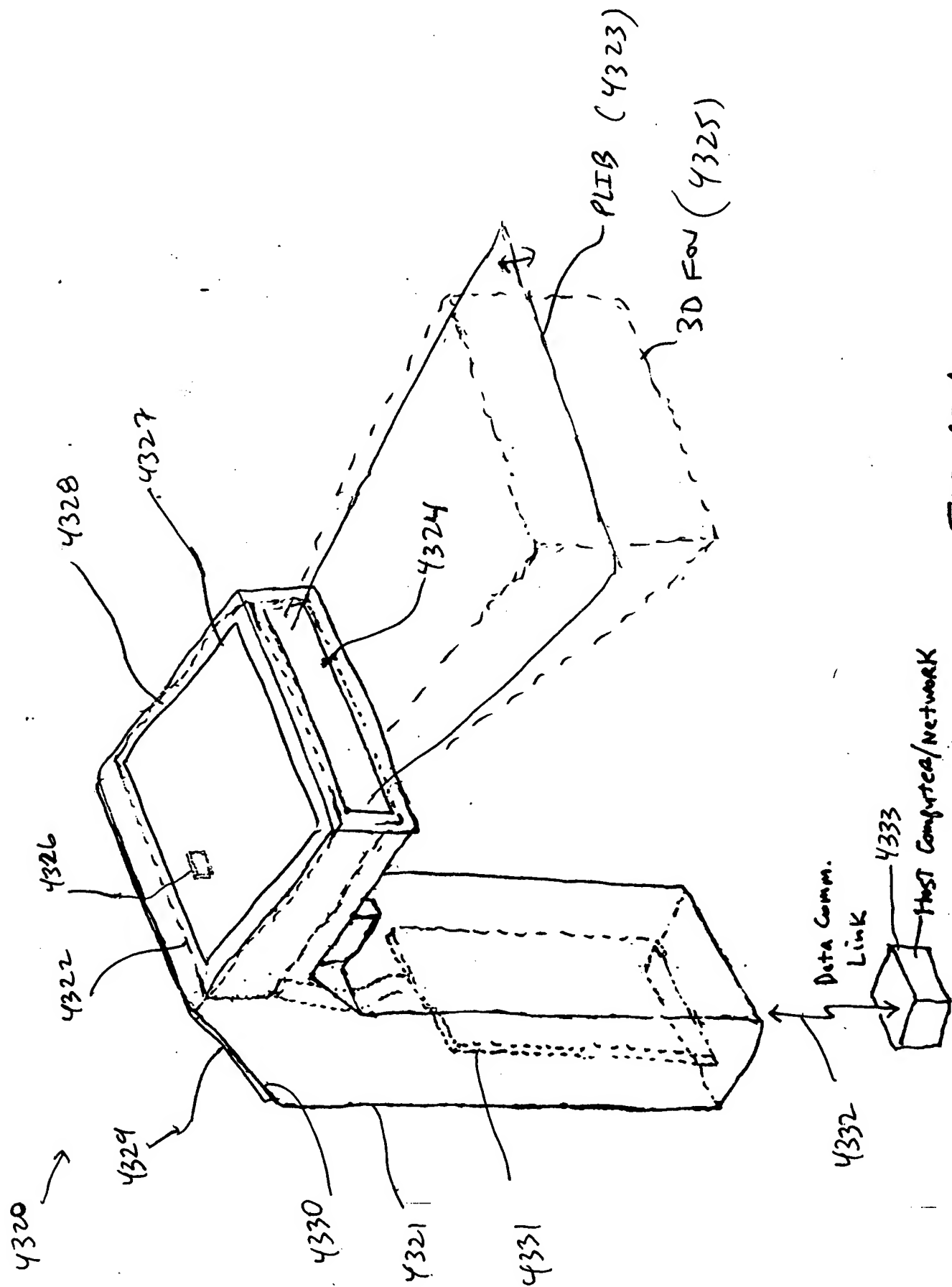


FIG. 61B

mod. hugging

Fig. 119A-19B



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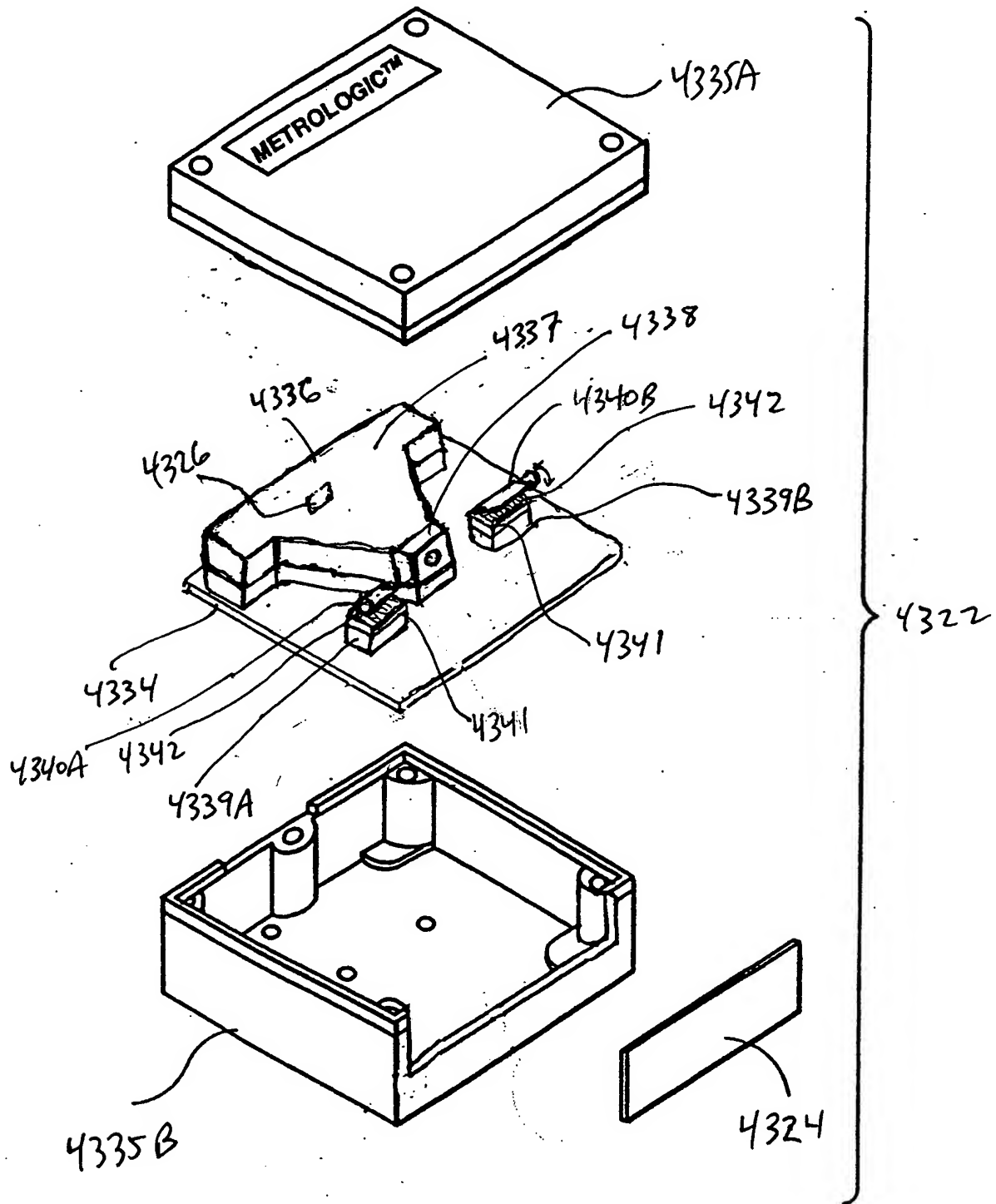


FIG. 62B

meas oscillim
Spotint intensity
mod. panel

Fig. 1F21A-2/D

FIG. 63A

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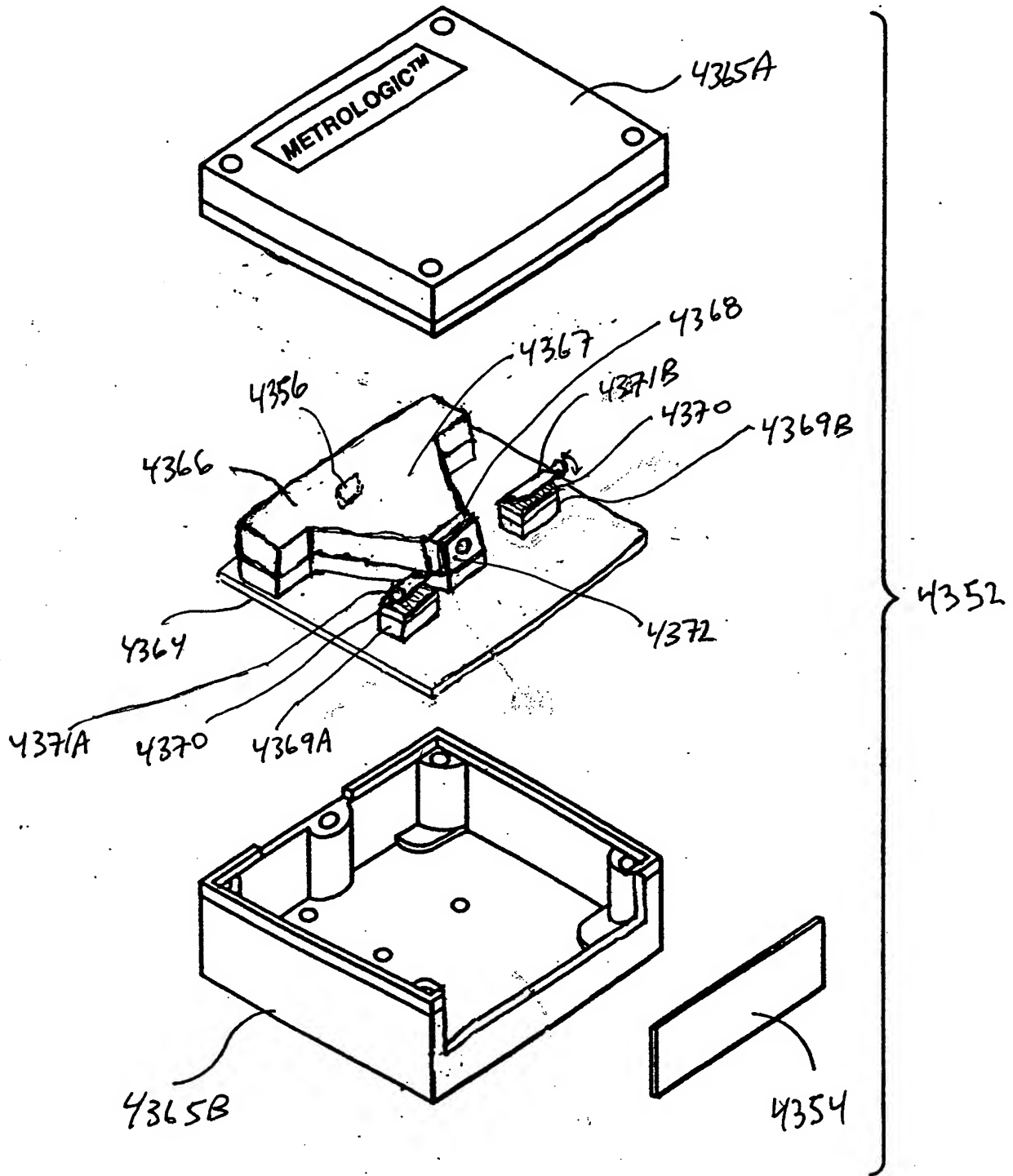


FIG. 63B

EDOC.
Mechanical Rotating Iris

Fig. 1E
23A-23B

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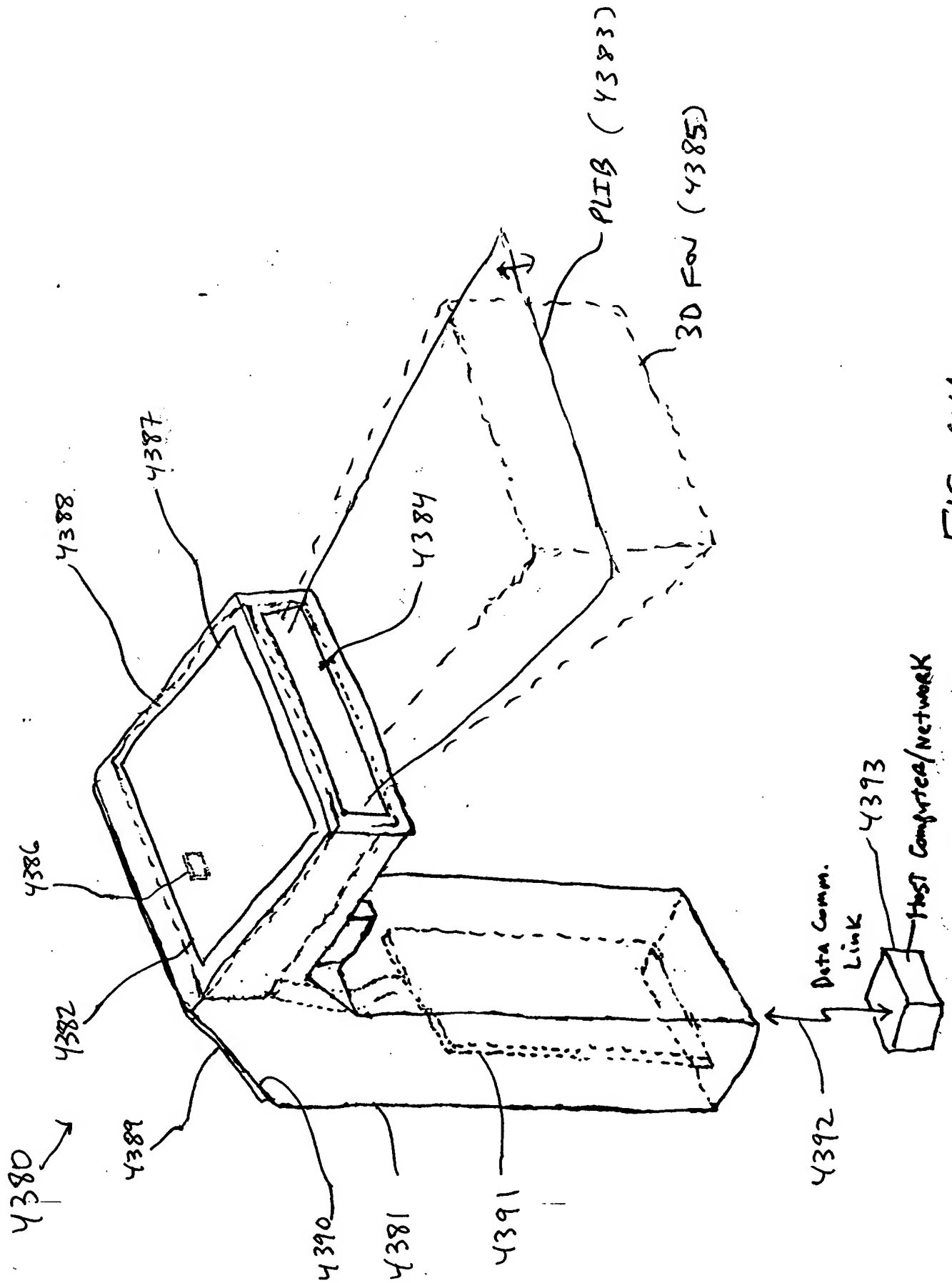


FIG. 64A

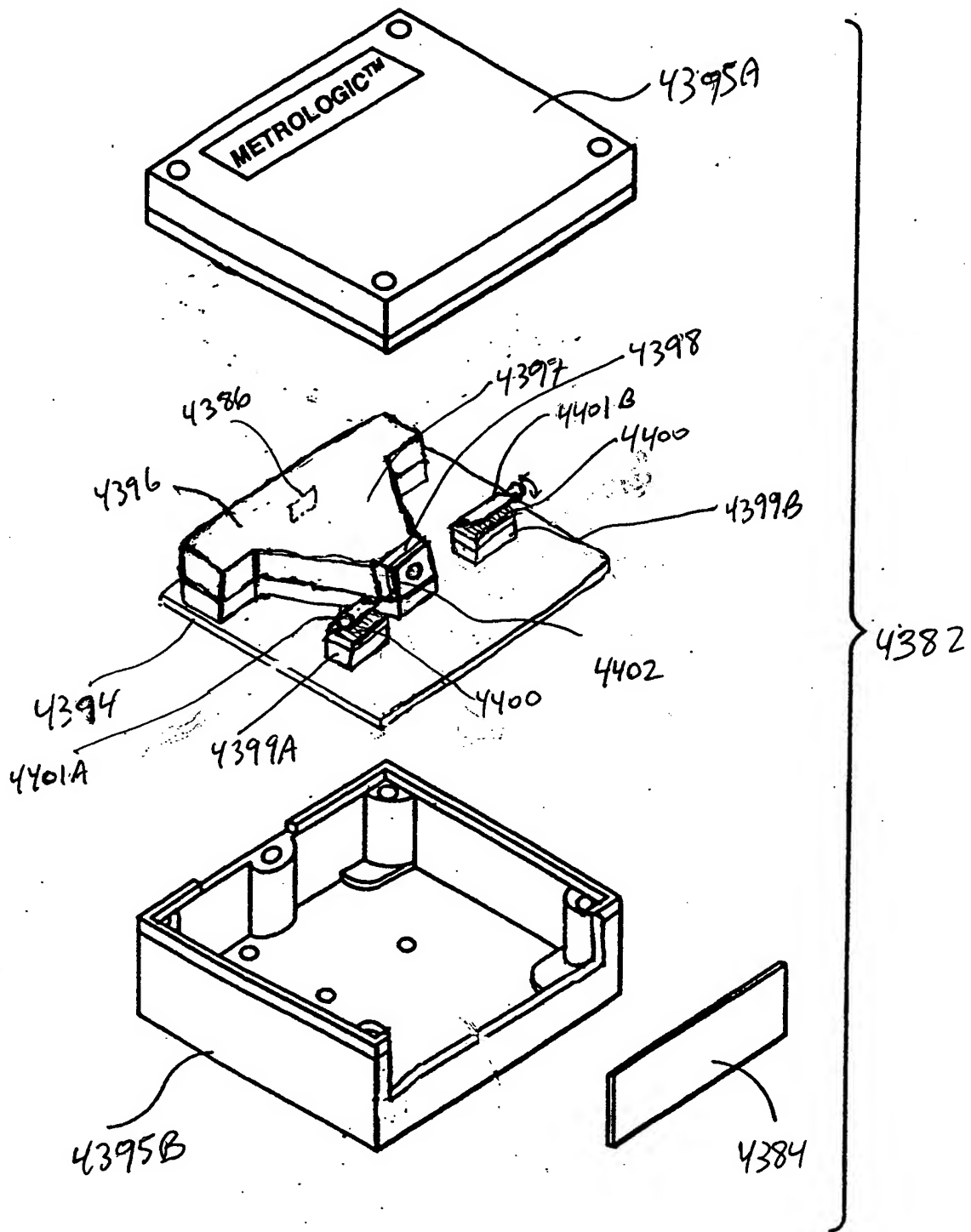


FIG. 64B

* E-optical
Shutter Before
IF Lens
Fig. 1E24A

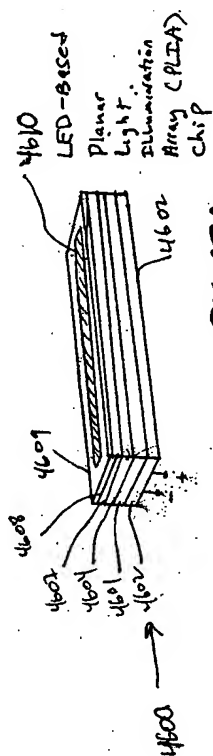


FIG. 67A

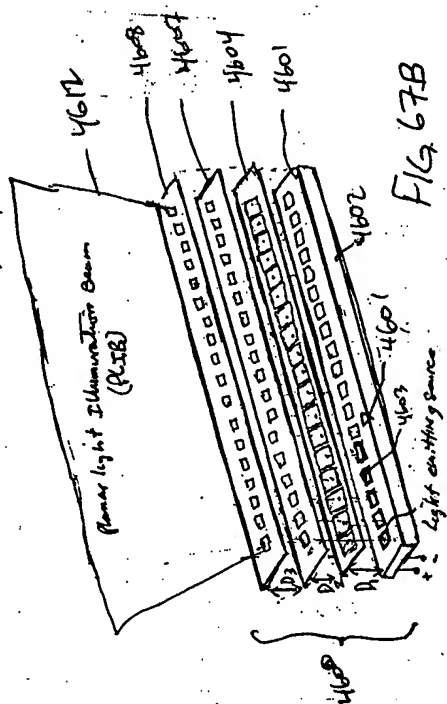


FIG. 67B

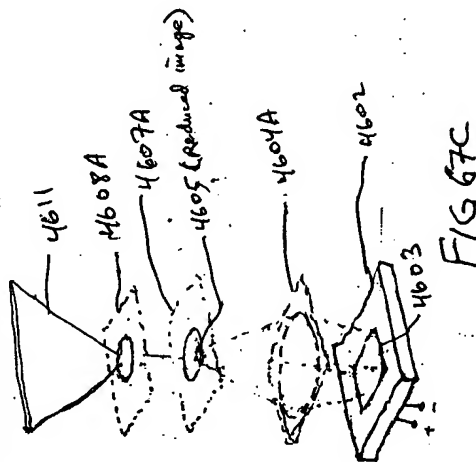


FIG. 67C

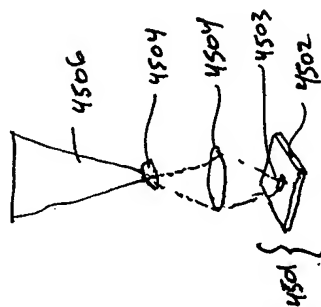


FIG. 65B

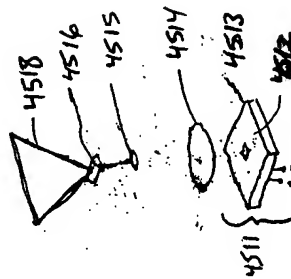


FIG. 66B

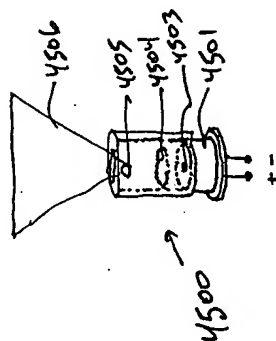


FIG. 65A

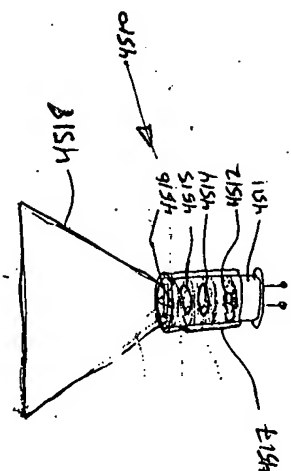


FIG. 66A

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Baggage check-in Station #1

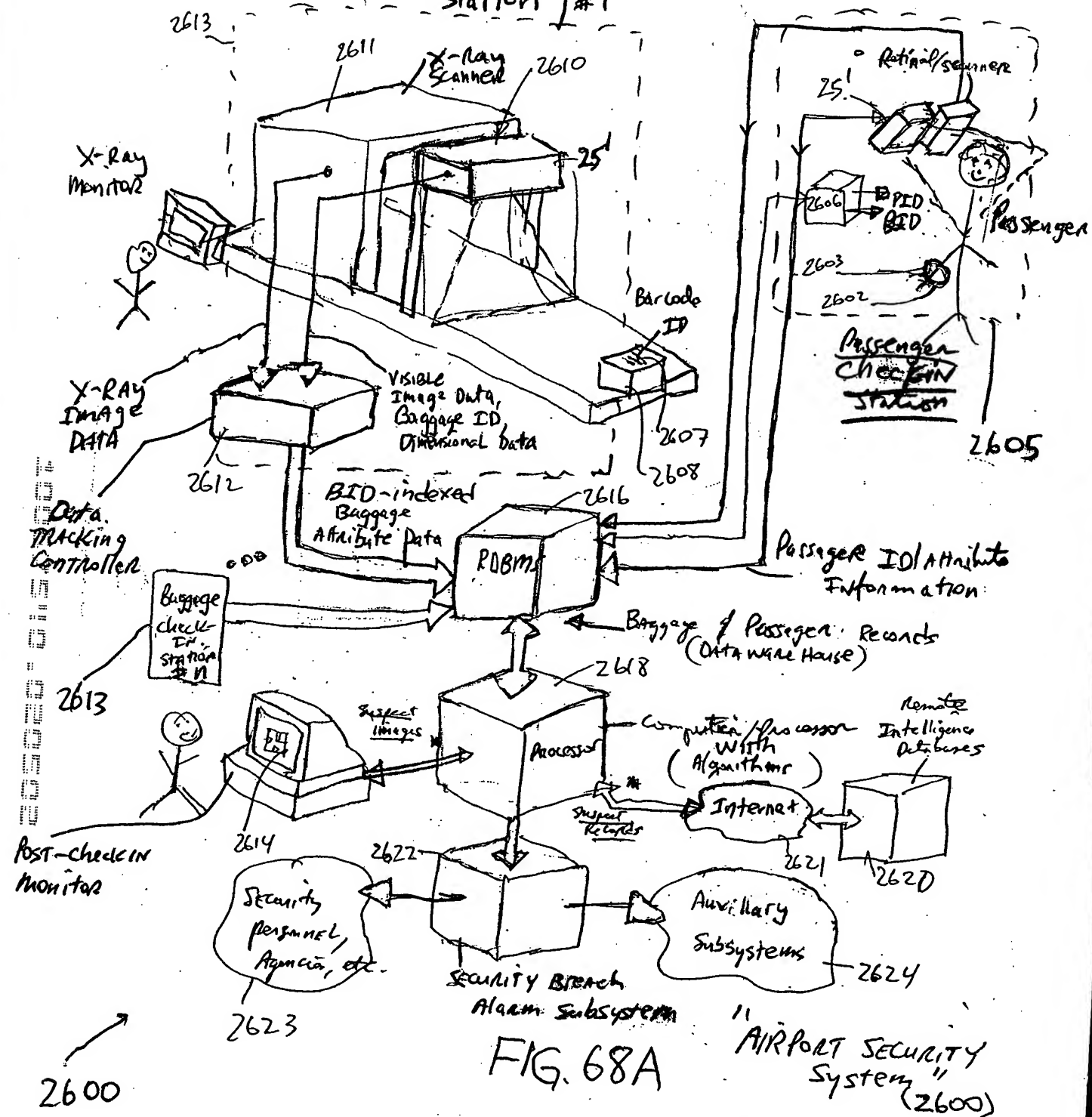


FIG. 68A

"AIRPORT SECURITY System" (2600)

RDBMS Record X

Attribute data	2621
Passenger ID #	2620
Baggage ID #	2622
Baggage ID #	2622

FIG. 68B